NUREG-0274
Five in a Series of
Five Reports

CATALOG OF PHYSICAL PROTECTION EQUIPMENT

Book 3
Volume VII. General Purpose Display Components

The MITRE Corporation
for
U. S. Nuclear Regulatory Commission

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Book 3

Volume VII. General Purpose Display Components

Wolf Haberman, and Others

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Reports in the Series

1. Guidelines for the Development of a Methodology for Measuring Level of Effectiveness of Physical Protection Facilities at Fixed-Site Facilities
   NUREG-0270

2. Physical Protection Equipment Study: Final Report
   NUREG-0271

3. Cross Reference Index for Equipment Catalog and Evaluation Guide
   NUREG-0272

4. Guide for the Evaluation of Physical Protection Equipment
   NUREG-0273

5. **Catalog of Physical Protection Equipment**
   NUREG-0274

ABSTRACT

A catalog of commercially available physical protection equipment has been prepared under MITRE contract AT(49-24)-0376 for use by the U. S. Nuclear Regulatory Commission (NRC). Included is information on barrier structures and equipment, interior and exterior intrusion detection sensors, entry (access) control devices, surveillance and alarm assessment equipment, contraband detection sensors, automated response equipment, general purpose displays and general purpose communications, with one volume devoted to each of these eight areas. For each item of equipment the information included consists of performance, physical, cost and supply/logistics data. The entire catalog is contained in three notebooks for ease in its use by licensing and inspection staff at NRC.

PREFACE AND ACKNOWLEDGEMENTS

The Catalog of Physical Protection Equipment presents information on currently used or currently available physical protection equipment that could be employed to safeguard special nuclear materials. The primary source of information was the responses of manufacturers and vendors to requests for literature and data, unless otherwise noted, and as discussed in the Final Report (NUREG-0271, MTR 3458). All equipment listed in the Catalog has been screened in accordance with the following general criteria, and only items meeting one or more of these criteria have been included:

- Equipment is commercially available off-the-shelf;
- Equipment is currently in use at commercial nuclear facilities licensed or to be licensed by NRC;
- Equipment is applicable for use at nuclear facilities licensed or to be licensed by NRC;
- Equipment can operate in the environmental conditions present at nuclear facilities;
- Equipment is not designed solely or primarily for residential use.

The final report describes the methodology and rationale used to create the Catalog of Physical Protection Equipment. Individuals seeking background information concerning the Catalog are directed to that report.

The Catalog of Physical Protection Equipment was edited and reviewed by W. L. Parlee; W. Haberman had overall responsibility for its preparation. Inputs to the Catalog were prepared by the following individuals, and their contributions are gratefully acknowledged:

Volume I.

L. I. Egelson	Sections 1, 4, 5, 6, 7, 8, 9, 10
R. G. Hansen	Sections 2, 3

Volume II.

J. L. Conway	Section 1
R. D. Cotell	Section 2
Z. Kohorn	Sections 11, 14
R. N. Lawson	Sections 4, 5, 7, 9, 12
J. O. Runkle	Sections 6, 8, 10, 13, 15
G. O. Sauermann	Section 3

Volume III.

W. L. Parlee

Volume IV.

G. O. Sauermann

Volume V.

A. J. Graff

Volume VI.

R. N. Lawson

Volume VII.

C. E. Dolberg

Volume VIII.

D. Stone

D. G. Willard

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- Category c. Embossed Card Locks
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- Category e. Coded Circuitry Card Locks

Section 3. Code Combination and Card Locks

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CRT ALPHANUMERIC DISPLAYS

CRT alphanumeric displays form one category of general purpose cathode ray tube (CRT) displays. In some respects these CRT displays are similar to conventional television receivers. Generally a medium-short-persistence phosphor (50 microseconds to 100 milliseconds) is used in the CRT, the same type of phosphor employed in conventional monochromatic TV receivers. In many cases the deflection circuitry for CRT alphanumeric displays is also the same as that used in the home TV sets.

A great variety of CRT displays, meeting many different requirements, is readily available. Their use in physical security systems is outlined in Volume VIII, Section 1 (Alarm Signalling Systems). CRT displays may interface with a computer or a similar display, or may operate as a keyboard-send-receive (KSR) or a receive-only (RO) teletype. The degree to which the displays meet requirements is determined by their intrinsic operational capabilities and the number and type of peripheral devices that support them or are supported by them. Such peripherals may include parallel displays, hard-copy output devices such as printers, and additional memory in the form of magnetic tape cassette record/playback devices.

The CRT display is comprised of five principal elements: The CRT with its associated display/deflection electronics; character-generating or display-forming circuitry; display memory; display control device(s); and circuitry for interfacing the display to external equipments. These elements may be either physically integrated into a single console/cabinet or interconnected by appropriate cables.

CRT alphanumeric displays generally use a raster scan or video deflection method. In this mode (the one used in conventional TV

sets), an electron beam sweeps continuously from left to right through a series of 525 horizontal lines over the entire screen area. A limited number of suppliers offer displays that have up to 1000 horizontal lines. These are generally special purpose devices and are substantially more costly than the conventional 525-line devices. All odd-numbered lines are scanned in one pass (one-sixtieth of a second), then the even-numbered lines are scanned in the next one-sixtieth of a second. This "interlace" of the scan lines completes the entire image or frame in one-thirtieth of a second. In a video or raster scan device the displayed characters are composed of dot patterns, which are formed with the electron beam "on" or unblanked for each dot.

The character generating or display forming circuitry accepts binary coded characters from the local keyboard or communications interface and converts them into deflection signals. Basic character generators produce 64 upper-case alphanumeric characters including a few special symbols. Extended generators can form more characters as well as many combinations of special symbols, upper and lower case alphanumerics and line drawing graphics.

The memory in CRT displays provides storage for refreshing the display image and supports the display controls and external and local interfaces. The refresh memory is used to sustain the character image on the face of the CRT at a refresh rate sufficient to prevent "flicker". The memory is usually large enough to store at least one "page" or screen full of data. If additional refresh storage is provided, the CRT display has a "paging" capability that permits the user to index lines that have rolled off the screen. The memory provides sufficient "buffering" to match the operational communications interface, and supports local cursor indexing, character/line insert/delete, tab, and format controls.

The CRT display control devices usually consist of a keyboard augmented with special function keys. The function keys provide cursor

control and edit controls such as erase and insert/delete character/line. Some CRT displays for special applications may have limited or augmented key input capabilities. For example, some displays may only have a numeric key pad, or may have a numeric key pad in addition to a complete keyboard. Other display controls, similar to those of conventional TV sets, are display brightness and contrast. These are separate from the keyboard but are generally accessible to the operator.

The interfacing circuitry couples the CRT display to external devices. These interfaces may include a teletype-compatible current loop, or may conform to the electrical and logic specifications of the Electronic Industry Association (EIA) RS-232 standards, or may provide Diode Transistor Logic/Transistor-Transistor Logic (DTL/TTL) signal levels. Some displays have built-in data sets or modems (modulator-demodulator) which not only convert the transmitted binary character code voltages into audible tones or frequencies that are acceptable to the communications lines, but also convert the received tones or frequencies to the binary signal needed by the display electronics. Many CRT displays provide switch-selectable input/output characteristics to permit a varicty of data rate, electrical, and logic interfaces. Data transmission and reception between the display and interconnected devices can occur simultaneously (full-duplex mode) or alternatively in one direction at a time (half-duplex). Other transmission modes are echoplex (keyboard-to-interconnected device simultaneously with interconnected device-to-display) and simplex (display-to-display only).

The performance parameters of CRT displays generally fall into one of two major interrelated areas: those that affect the "legibility" of the presented information, and those that are related to the particular operational mode(s) in which the display is employed.

Legibility performance depends on many factors, including the contrast between the displayed image and the background; screen luminance and ambient illuminance; display screen characteristics such as screen blemishes, ion and/or pattern burns, and screen

noise which creates elemental variations in radiant emission across the screen; spot and character/symbol size and spacing; character/symbol flicker; and jitter of the displayed characters/symbols. Measures of overall legibility are determined by statistical methods. However, if the above aspects are satisfactory, and the operational mode performance needs are met, the display is generally suitable.

The operational performance capability also depends on the capabilities of the basic elements. Certain factors, however, have more impact than others in determining operational capability. Some of these are the size of the screen or viewing area, the number and types of characters/symbols displayed; interface characteristics such as data rates, signal levels and types; information transfer capabilities; block, page, line or character transfer rules and procedures. In addition, the physical operational environment in regards to ambient lighting and the position of the display (viewing angle/distance) with respect to the operator both impact on the overall performance of the CRT displays for their intended uses.

The degree of maintenance capability required depends on the complexity of the CRT display. The simpler displays (such as the KSR and RO teletype equivalent) depend on scheduled maintenance activities. Faults or degradation in performance occurring between scheduled periods are usually detected visually, backed up by visual "trouble" light indications. The more sophisticated displays that are interconnected to a computer may have periodic offline/online diagnostic checks made automatically to indicate faults and confirm satisfactory operation. These diagnostics range in capability from simple "go-no-go" tests up to canned/simulated operational tests which exercise the entire display.

Inasmuch as the general purpose CRT displays are manufactured for a wide range of applications, tamper switches are not incorporated therein. However, the displays have incorporated provisions for re-

ducing effects of RFI and EMI because they are normally collocated with other equipments, e.g., computers, memory devices.

Most CRT alphanumeric displays use both the CRT and the deflection circuitry contained in conventional TV sets. In fact, many display manufacturers obtain the basic TV chassis containing the CRT and deflection electronics from TV set manufacturers and incorporate their own character generator, memory, display controls and interface logic. Conventional TV set deflection electronics together with the beam control circuitry form the characters/symbols using a dot matrix. The most common matrix is a 5 x 7 pattern; some displays use a barely legible 3 x 5 dot matrix, while others use more precise matrices ranging up to a 9 x 13 or 9 x 14 dot matrix. These last two matrices are usually incorporated in displays that provide closer to 1000 scan lines. The total number of displayed characters/symbols not only depends on the dot pattern selected but also on the total number of resolvable lines. With the conventional TV set type of deflection, the spacings between characters, words and lines are fixed. Statistical tests have shown that for good legibility the spacing between characters should be at least equivalent to one-sixth the character height, the spacing between words at least equivalent to one character width, and the spacing between lines at least equivalent to one-half the character height.

The display should be positioned so that the nominal viewing distance is 16 inches (41 cm) for a display screen size of 13 x 41 in (33 x 35.6 cm). If the viewing distance is much greater than 16 inches, (41 cm), displays should be selected that have larger character/symbol sizes, greater brightness ranges, and larger character, word and line spacing.

The costs of CRT alphanumeric displays range from $500 to $15,000 in purchase price and from $25 to about $400 a month for leasing. The

average purchase price is about $4500, and the average lease cost is about $150.

The data sheets for this category show that there are numerous options available for interfacing with appended devices. These options, as abbreviated, are: LP - Line/Page Printer; PC - Copier; PT - Paper Tape; CT - Cassette Transport; MT - Magnetic Tape Transport; and DD - Disk Drive.

ALPHANUMERIC CRT DISPLAYS

Manufacturer	ACME-DIVAC Industries 13025 Cerise Avenue Hawthorne, CA 90250 (213) 772-5445	ACRODYNE 320 Colfax Avenue Clifton, NJ 07013 (201) 773-2012	Ann Arbor Terminals 918 Green Street Ann Arbor, MI 48104 (313) 769-0926
Model	ADI 760		200 Series
Evaluation Guide Procedure VII-1.A	NRC Identification No.		

PERFORMANCE DATA

Display			
Size	11in (28cm) diagonal	Information not available	Information not available
# Char.	2,400	800/1, 440/1, 600	256, 512/1, 280
Char./Line	32/36/40/64/72/80	40/72/80	32/80
# Lines	—	—	—
Char. Set	64 ASCII (L.C. opt.)	ASCII	64 ASCII
Char. Form	9x14 Stroke	Dot	5x7 Dot
Data Entry			
Insert/Delete	Char. & line (opt.)	Char. & line (std)	Information not available
Tab	Horizontal (std.)	Horizontal and Vertical (std.)	Horizontal (opt.)
Formatting	Optional	Standard	Information not available
Page Roll	Standard	Standard	Standard
Split Screen	Optional	Optional	Information not available
Other	Blinking (opt.)	Two pages of storage (opt.)	—
Communications			
Interface	RS232B, current loop, parallel computer	RS232B, current loop, par. comp. Acoust. coupler	RS232B, current loop, par. comp. Acoust. coupler modem
Data Rate	Up to 9,000bps	110/135/300bps	Up to 12,000bps
Mode	H&F duplex, Echoplex	Half & full duplex	H & F duplex, Echoplex
Compatability	TTY ASR 33 — IBM 2260/65 (see notes)	TTY — IBM 2260/65	TTY 33
Other	Output for Video monitor	—	—

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Options	LP, MT, ADI740-760 Replaces IBM 2260/2848	LP, CT, MT

INSTALLATIONS

ALPHANUMERIC CRT DISPLAYS

Manufacturer	Beehive Medical Elect. 1473 South 6th West Salt Lake City, UT 84104 (801) 487-0741	Beehive Medical Elect. 1473 South 6th West Salt Lake City, UT 84104 (801) 487-0741	Beehive Medical Elect. 1473 South 6th West Salt Lake City, UT 84104 (801) 487-0741
Model	Model One-A	Model Two-A	Model Three-A

Evaluation Guide Procedure VII-1.A NRC Identification No.

PERFORMANCE DATA

Display			
Size	6x9in (15.2x22.9cm)	6x9in (15.2x22.9cm)	6x9in (15.2x22.9cm)
# Char.	1,600	1,600	1,600
Char./Line	80	80	80
# Lines	20	20	20
Char. Set	64 ASCII (96 ASCII opt.)	64 ASCII (96 ASCII opt.)	64 ASCII (96 ASCII opt.)
Char. Form	5x7 Dot	5x7 Dot	5x7 Dot
Data Entry			
Insert/Delete	Information not available	Line (std.)	Char. & Line (std.)
Tab	Information not available	Horz. (std.)	Horz. (std.)
Formatting	Information not available	Information not available	Standard
Page Roll	Standard	Standard	Standard
Split Screen	Information not available	Information not available	Standard
Other	Blinking (opt.)	Blinking (opt.) block transfer	Blinking (opt.) block transfer
Communications			
Interface	RS232B, parallel comp.	RS232B, current loop parallel computer	RS232B, current loop, parallel computer
Data Rate	Up tp 3,600bps	Up to 3,600bps	Up to 3,600bps
Mode	H & F duplex	Half-duplex, Echoplex	Half-duplex, Echoplex
Compatability	TTY 33	TTY 33	TTY 33
Other	—	—	—

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Options	CT	CT	CT

INSTALLATIONS

ALPHANUMERIC CRT DISPLAYS

Manufacturer	Bendix Interactive Terminals Corp. Bendix Center Southfield, MI 48076 (313) 352-6035	Bendix Interactive Terminals Corp. Bendix Center Southfield, MI 40876 (313) 352-6035	Bunker-Ramo Business & Industry Division Trumbull Industry Pk. Trumbull, CT 06611 (203) 377-4141
Model	Logiport/1	4300 Series	888 and 960

Evaluation Guide Procedure VII-1.A NRC Identification No.

PERFORMANCE DATA

Display			
Size	5x7 (12.7x17.8cm)	5x7 (12.7x17.8cm)	8.75x6.25in (22.2x15.8cm)
# Char.	512	320 to 1,600	880 for 888, 960 for 960
Char./Line	32	32/40/64/80	80
# Lines	16	10/20	12/24
Char. Set	ASCII	64 ASCII	92 ASCII
Char. Form	5x7 Dot	5x7 Dot	5x7 Dot
Data Entry			
Insert/Delete	Char. & line (std.)	Char & line (opt.)	Char. (std.)
Tab	Vertical (std.)	Horizontal (opt.)	Horz. & Vert. (std.)
Formatting	Standard	Optional	Standard
Page Roll	Standard	Standard	Information not available
Split Screen	Information not available	Optional	Standard
Other	Local & page transmit	Page & field print/ transmit	—
Communications			
Interface	RS232B, current loop, acoustic coupler	RS232C, current loop, parallel computer	RS232B, parallel computer
Data Rate	110/300bps	Up to 9,600bps	Up to 4,800bps
Mode	Half & full duplex	Half & full duplex	Half & full duplex
Compatability	TTY 32	TTY	Information not available
Other	—	—	Output for video monitor

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Unit is portable. — Options: LP, MT

INSTALLATIONS

725 090

ALPHANUMERIC CRT DISPLAYS

Manufacturer	Bunker-Ramo Business & Industry Division Trumbull Indust. Pk. Trumbull, CT 06611 (203) 377-4141	Burroughs Corp. Second Avenue Detroit, MI 48232 (313) 875-2260	Centronics One Wall Street Hudson, NH 03051 (603) 889-6128
Model	2212	B 935	301

Evaluation Guide Procedure VII-1.A NRC Identification No.

PERFORMANCE DATA

Display			
Size	3x4in (7.6x10cm)	12x8in (30.5x20.3cm)	5.5x4in (14x10cm)
# Char.	444	2,000	132
Char./Line	37	80	33
# Lines	12	40	4
Char. Set	62 ASCII	64 ASCII (see notes)	63 ASCII
Char. Form	5x7 Stroke	Stroke	5x7 Dot
Data Entry			
Insert/Delete	Char. (std.)	Char & line (opt.)	Char. (std.)
Tab	Horz. & vert (std.)	Horz. & vert. (std.)	Information not available
Formatting	Standard	Optional	Information not available
Page Roll	Information not available	Information not available	Information not available
Split Screen	Standard	Optional	Information not available
Other		Programmable, cursor	
Communications			
Interface	RS232B, parallel comp.	RS232B	RS232B, parallel comp.
Data Rate	Up to 2,400bps	Up to 9,600bps	
Mode	Half-duplex	Half-duplex	Half & full duplex
Compatability	Information not available	Information not available	Information not available
Other	Output for video monitor	—	—

PHYSICAL DATA

Environment			
Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Options:	LP, MT	Printer copier, opt.	LP

INSTALLATIONS

ALPHANUMERIC CRT DISPLAYS

Manufacturer	Communitype Corp. 767 Fifth Ave. New York, NY 10022 (212) 758-4230	Communitype Corp. 767 Fifth Ave. New York, NY 10022 (212) 758-4230	Communitype Corp. 767 Fifth Ave. New York, NY 10022 (212) 758-4230
Model	2000	1000	1023

Evaluation Guide Procedure VII-1.A NRC Identification No.

PERFORMANCE DATA

Display			
Size	7.25x6in (18.4x15.2cm) 2 disp./term	9x7in (22.9x17.8cm)	9x7in (22.9x17.8cm)
# Char.	800 ea. — 2 disp./term	800	1,440
Char./Line	40	40	72
# Lines	20 ea. — 2 disp./term	20	20
Char. Set	64 ASCII; EBCDIC	64 ASCII; EBCDIC	64 ASCII; EBCDIC
Char. Form	Dot	Dot	Dot
Data Entry			
Insert/Delete	Char. & line (opt.)	Char. & line (opt.)	Char. & line (opt.)
Tab	Horz. & vert. (opt.)	Horz. & vert. (opt.)	Horz. & vert. (opt.)
Formatting	Optional	Optional	Optional
Page Roll	Standard	Standard	Standard
Split Screen	Optional	Standard	Standard
Other	Page scroll, erase to end of page, blinking (opt.), two-page display	Page scroll, erase to end of page, blinking (opt.)	Page scroll, erase to end of page, blinking (opt.)
Communications			
Interface	RS232B, current loop, parallel computer acoustic coupler, modem	RS232B, current loop, parallel computer acoustic coupler, modem	RS232B, current loop, parallel computer acoustic coupler, modem
Data Rate	110/150/300bps (see note)	110/150/300bps (see note)	110/150/300bps (see note)
Mode	Half & full duplex, Echoplex	Half & full duplex, Echoplex	Half & full duplex, Echoplex
Compatability	TTY 33	TTY 33	TTY 33
Other	—	—	—

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

to 9,600 or 500kHz (opt) Options: LP, CT	to 9,600 or 500kHz (opt.) Options: LP, CT	to 9,600 or 500kHz (opt.) Options: LP, CT

INSTALLATIONS

ALPHANUMERIC CRT DISPLAYS

Manufacturer	Computek 143 Albany St. Cambridge, MA 02139 (617) 864-5140	Computer Communications 5933 West Slauson Ave. Culver City, CA 90230 (213) 390-7777	Computer Consoles 1257 University Ave. Rochester, NY 14607 (716) 473-7180
Model	Series 200	CC-335	
Evaluation Guide Procedure VII-1.A	NRC Identification No.		

PERFORMANCE DATA

Display			
Size	14in (35.6cm) diagonal	3.25x8.25in (8.2x21cm)	5.75x11.25in (14.6x28.6cm)
# Char.	2,000	960	960 to 1,920
Char./Line	80	72/80	80
# Lines	25	12	12 to 24
Char. Set	64 ASCII	64 ASCII	42 ASCII
Char. Form	9x13 Dot	5x7 Dot	5x7 Dot
Data Entry			
Insert/Delete	Char. & line (std.)	Char. & line (std.)	Char & line (std.)
Tab	Standard	Horizontal (std.)	Horz. & vert. (std.)
Formatting	Standard	Standard	Standard
Page Roll	Standard	Information not available	Optional
Split Screen	Standard	Standard	Optional
Other	—	Block transfer	—
Communications interface	RS232C	RS232B, current loop, acoustic coupler	RS232B
Data Rate	110 to 9,600bps	110/1,200bps	1,200 to 2,400bps
Mode	Half & full duplex	Half & full duplex	Half duplex
Compatability	Information not available	TTY	TTY 33/35, IBM 2260 65
Other	—	—	—

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Storage of up to 4Kx 16-bits Options: LP, PT, CT, DD	Unit is Portable Options: LP, CT	Options: LP, PT, MT

INSTALLATIONS

ALPHANUMERIC CRT DISPLAYS

Manufacturer	Computer Optics Berkshire Ind. Pk. Bethel, CT 06801 (203) 744-6720	Computer Terminal 9725 Datapoint Drive San Antonio, TX 78229 (512) 696-4520	Computer Terminal 9725 Datapoint Drive San Antonio, TX 78229 (512) 696-4520
Model		2200	3300

Evaluation Guide Procedure VII-1.A NRC Identification No.

PERFORMANCE DATA

Display			
Size	7.5x9.5in (19x24.1cm)	3x7in (7.6x17.8cm)	8x6in (20.3x15.2cm)
# Char.	3,840	960	1,800
Char./Line	40/64/80/100	80	72
# Lines	6/10/12/15/30	12	25
Char. Set	128 ASCII	96 ASCII; EBCDIC	64 ASCII
Char. Form	—	5x7 Dot	5x7 Dot
Data Entry			
Insert/Delete	Char. (std) line (opt)	Information not available	Information not available
Tab	Horz & vert (opt)	Information not available	Information not available
Formatting	Standard	Information not available	Standard
Page Roll	Information not available	Information not available	Standard
Split Screen	Standard	Information not available	Information not available
Other	Block transfer	Software controlled edit & data entry	Programmable cursor
Communications			
Interface	RS232B	RS232B, current loop, parallel computer, modem	RS232B
Data Rate	2,400 bps	110 to 2,400 bps	110 to 2,400 bps
Mode	Half & full duplex	Half & full duplex, Echoplex	Half & full duplex, Echoplex
Compatability	IBM 2260/65	TTY 33/35/37, IBM 2260/65	TTY 33/35
Other	RCA communications compatible	Programmed to emulate any type terminal	—

PHYSICAL DATA

Environment			
Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA			
Price	Information not obtained	Information not obtained	Information not obtained
NOTES			
		Options: LP, MT, DD	Options: LP
INSTALLATIONS			

ALPHANUMERIC CRT DISPLAYS

Manufacturer	Computer Terminal 9725 Datapoint Drive San Antonio, TX 78229 (512) 696-4520	Conrac Corp. 600 No. Rimsdale Ave. Covina, CA 91722 (213) 966-3511	Conrac Corp. 600 No. Rimsdale Ave. Covina, CA 91722 (213) 966-3511
Model	3360	201	401

Evaluation Guide Procedure VII-1.A NRC Identification No.

PERFORMANCE DATA

Display			
Size	6x8in (15.2x20.3cm)	8x11.5in (20.3x28.6cm)	7x9.75in (17.8x24.7cm)
# Char.	2,048	960	2,000
Char./Line	80	80	80
# Lines	24	12	25
Char. Set	64 ASCII	64 ASCII	128 ASCII
Char. Form	5x7 Dot	5x7 Dot	5x7 Dot
Data Entry			
Insert/Delete	Char & line (opt)	Information not available	Char & line (opt)
Tab	Information not available	Horz (opt) vert (std)	Horz & vert (opt)
Formatting	Optional	Optional	Optional
Page Roll	Information not available	Information not available	Optional
Split Screen	Optional	Information not available	Information not available
Other	Edit 7 data entry	Information not available	Dual intensity, double char size — blinking jump & report cursor
Communications			
Interface	RS232B	RS232B, current loop	RS232B, current loop, parallel computer
Data Rate	300 to 4,800 bps	2,400 bps	9,600 bps
Mode	Full-duplex	Half-duplex	Half-duplex
Compatability	IBM 2260/65	Information not available	TTY 33/35/37; IBM 2260/65
Other	—	—	—

PHYSICAL DATA

Environment			
Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

725 099

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Controls up to 64 Terminals Options: LP	Options: LP	Options: LP, CT

INSTALLATIONS

ALPHANUMERIC CRT DISPLAYS

Manufacturer	Control Data Corp 8100 34th Ave. So. Minneapolis, MN 55420 (612) 888-5555	Control Data Corp. 8100 34th Ave. So. Minneapolis, MN 55420 (612) 888-5555	Control Data Corp. 8100 34th Ave. So. Minneapolis, MN 55420 (612) 888-5555
Model	711 and 92411	713 and 92413	9805 and 9806

Evaluation Guide Procedure VII-1.A NRC Identification No.

PERFORMANCE DATA

Display			
Size	8x10in (20.3x25.4cm)	8x10in (20.3x25.4cm)	—
# Char.	640 for 711 and 1,280 for 92411	640 for 713 and 1,280 for 92413	1,040
Char/Line	80	80	50 for 9805 and 80 for 9806
# Lines	8/16	8/16	20 for 9805 and 13 for 9806
Char. Set	96 ASCII (See notes)	96 ASCII (See notes)	64 ASCII
Char. Form	Information not available	Information not available	Information not available
Data Entry			
Insert/Delete	Char & line (std)	Information not available	Information not available
Tab	Horz & vert (std)	Information not available	Horz & vert (std)
Formatting	Standard	Information not available	Information not available
Page Roll	Information not available	Information not available	Information not available
Split Screen	Information not available	Information not available	Information not available
Other	—	—	Blinking
Communications			
Interface	RS232C, modem	RS232C	RS232C, modem
Data Rate	4,800 bps	75 to 300 bps	2,000 bps for 9805 and 2,400 bps for 9806
Mode	Half-duplex	Half & full duplex	—
Compatability	Information not available	Information not available	Information not available
Other	—	—	—

PHYSICAL DATA

Environment			
Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Numeric only keyboard (std) Options: LP, CT, MT	Numeric only keyboard (std) Options: LP, CT, MT	Options: LP

INSTALLATIONS

ALPHANUMERIC CRT DISPLAYS

Manufacturer	Control Data Corp. 8100 34th Ave. Minneapolis, MN 55420 (612) 888-5555	Control Data Corp. 8100 34th Ave. So. Minneapolis, MN 55420 (612) 888-5555	Courier Terminal Systems 2202 E. Univ. Drive Phoenix, AZ 85034 (602) 244-1392
Model	9812 and 9813	9814	Executerm 60 and Executerm 65

Evaluation Guide Procedure VII-1.A NRC Identification No.

PERFORMANCE DATA

Display			
Size	6x8in (15.2x20.3cm)	6x8in (15.2x20.3cm)	14x17in (35.6x43.2cm)
# Char.	1,000	1,040	480
Char./Line	50	50/80	40
# Lines	20	20/13	12
Char. Set	Information not available	Information not available	64 ASCII
Char. Form	Information not available	Information not available	7x8 Dot
Data Entry			
Insert/Delete	Information not available	Information not available	Char (std)
Tab	Information not available	Information not available	Horz & vert (std)
Formatting	Information not available	Information not available	Standard
Page Roll	Information not available	Information not available	Standard
Split Screen	Information not available	Information not available	Information not available
Other	—	—	—
Communications			
Interface	Modem (9812) parallel comp. (9813)	RS232B, modem	RS232B
Data Rate	2,400 bps (9812) 50,000 cps (9813)	2,000/2,400 bps	1,200 to 4,800 bps
Mode	—	—	Half-duplex
Compatability	Information not available	Information not available	IBM 2260 for 60 and IBM 2265 for 65
Other	—	—	—

PHYSICAL DATA

Environmental Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Options: LP

INSTALLATIONS

ALPHANUMERIC CRT DISPLAYS

Manufacturer	Courier Terminal Systems 2202 E. Univ. Drive Phoenix, AZ 85034 (602) 244-1392	Data 100 Corp. 7725 Wash Ave. So. Minneapolis, MN 55435 (612) 941-6500	Data Access Systems 503 Route 10 Dover, NJ 07801 (201) 361-2345
Model	Executerm 260 and Executerm 265	Model 73	VST 2000

Evaluation ..ide Procedure VII-1.A NRC Identification No.

PERFORMANCE DATA

Display			
Size	19x20in (48x50cm)	9x6in (22.9x15.2cm)	10.5x8in (27x20.3cm)
# Char.	1,920/960	1,920	1,296
Char./Line	80	72/80	72
# Lines	24/12	12/24	18
Char. Set	128 ASCII	64 ASCII (See notes)	64 ASCII
Char. Form	7x8 Dot	5x7 Dot	5x7 Dot
Data Entry			
Insert/Delete	Char (std)	Information not available	Char (std)
Tab	Horz & vert (std)	Horz (std)	Information not available
Formatting	Standard	Information not available	Standard
Page Roll	Standard	Standard	Information not available
Split Screen	Standard	Information not available	Optional
Other	Blinking	Line/page transmission	—
Communications			
Interface	RS232B, modem	RS232B	RS232B, modem
Data Rate	300 to 4,800 bps	110 to 1,200 bps	2,400 bps
Mode	Half-duplex	Half & full duplex, Echoplex	Half & full duplex
Compatability	IBM 2260 for 60 and IBM 2265 for 65	TTY 33/35	TTY 33/35
Other	—	—	—

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Options: LP	Numeric only keyboard (std) Options: LP, CT	Options: CT

INSTALLATIONS

ALPHANUMERIC CRT DISPLAYS

Manufacturer	Data Input Devices Route 28 Derry, NH 03038 (603) 434-5208	Datapoint Corp. 9725 Datapoint Dr. San Antonio, TX 78284 (512) 696-4520	Datapoint Corp. 9725 Datapoint Dr. San Antonio, TX 78284 (512) 696-4520
Model	70	1100 Series	3600 Datastation

Evaluation Guide Procedure VII-1.A NRC Identification No.

PERFORMANCE DATA

Display			
Size	4x3in (10x7.6cm)	7x3.5in (17.8x8.9cm)	8.5x5.5in (21.6x14cm)
# Char.	100	Information not available	Information not available
Char./Line	20	80	80
# Lines	5	12	24
Char. Set	64 ASCII	96 (incl lower case)	94 (incl lower case)
Char. Form	5x7 Dot	5x7 Dot	5x7 Dot
Data Entry			
Insert/Delete	Char (std)	Information not available	Information not available
Tab	Information not available	Information not available	Information not available
Formatting	Standard	Information not available	Information not available
Page Roll	Information not available	Information not available	Information not available
Split Screen	Information not available	Information not available	Information not available
Other	—	Stand-alone operation Prog by user, blinking auto answer, cursor moved by CPU	Prog by CPU — Blinking — cursor moved by CPU
Communications			
Interface	RS232B, modem	RS232C, parallel	RS232C
Data Rate	9,600 bps	8,800 bps syn/ 9,600 bps	9,600 bps async
Mode	Half-duplex	Full & half duplex	Full duplex
Compatability	—	—	—
Other	—	—	—

PHYSICAL DATA

Environment			
Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Options: CT

INSTALLATIONS

ALPHANUMERIC CRT DISPLAYS

Manufacturer	Datamedia Corp. 537 So. Blackhorse Pike Blackwood, NJ 08012 (609) 227-7515	Delta Data Systems Woodhaven Ind. Pk. Cornwells Hts., PA 19020 (215) 639-9400	Delta Data Systems Woodhaven Ind. Pk. Cornwells Hts., PA 19020 (215) 639-9400
Model	Elite 2000	TelTerm I	TelTerm II
Evaluation Guide Procedure VII-1.A	NRC Identification No.		

PERFORMANCE DATA

Display			
Size	8.5x6in (21.6x15.2cm)	11x9in (28x22.9cm)	11x9in (28x22.9cm)
# Char.	960/1,440/1,920	3,000 (Stored in Memory)	3,000 (Stored in Memory)
Char./Line	80	80	80
# Lines	12/18/24	27	27
Char. Set	64 ASCII	64/96 ASCII	64/96 ASCII
Char. Form	5x7 Dot	7x9 Dot	7x9 Dot
Data Entry			
Insert/Delete	Char (std)	Information not available	Char & line (std)
Tab	Information not available	Horz (opt)	Horz & vert (std)
Formatting	Information not available	Information not available	Standard
Page Roll	Standard	Standard	Standard
Split Screen	Information not available	Standard	Standard
Other	—	Blinking, paging (std) lower case, light pen (opt)	Blinking, paging (std) lower case, light pen (opt)
Communications			
Interface	RS232B, current loop	RS232B, current loop, parallel computer acoustic coupler, modem,	RS232B, current loop, parallel computer acoustic coupler modem
Data Rate	1,800bps	9,600bps 500,000	9,600bps 500,000
Mode	Half & full duplex Echoplex	Half duplex Echoplex	Half duplex Echoplex
Compatability	TTY 33/35	TTY 33/35	TTY 33/35
Other	—	—	Computer Interface available

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

	Options: LP, CT	Options: LP, CT

INSTALLATIONS

ALPHANUMERIC CRT DISPLAYS

Manufacturer	Delta Data Systems Woodhaven, Ind. Pk. Cornwells Hts, PA 19020 (215) 639-9400	Datamedia Corp 537 So. Blackhorse Pk. Blackwood, NJ 08012 (609) 227-7515	Digi-Log Systems 300 E. Lancaster Ave. Wynnewood, PA 19096 (215) 879-3303
Model	DELTA 2000	Elite 1500	TeleComputer 109
Evaluation Guide Procedure VII-1.A	NRC Identification No.		

PERFORMANCE DATA

Display			
Size	10in (25.4cm) diagonal (see notes)	8.5x6in (21.6x15.2cm)	TV Set
# Char.	960 (see notes)	480 to 1,920	256
Char./Line	40	64/80	32
# Lines	24	6 to 24	8
Char. Set	64/96 ASCII (see notes)	64 ASCII	64 ASCII
Char. Form	5x7 Dot (see notes)	5x7 Dot	5x7 Dot
Data Entry			
Insert/Delete	Char (opt) line (std)	Char (std)	Char & line (std)
Tab	Horz (opt)	Information not available	Information not available
Formatting	Optional	Information not available	Information not available
Page Roll	Optional	Standard	Optional
Split Screen	Optional	Information not available	Information not available
Other	—	—	—
Communications			
Interface	RS232B, current loop, parallel computer	RS232C	RS232B, current loop acoustic coupler, modem
Data Rate	15,000cps	50 to 1,800bps	1,200bps
Mode	Half & full duplex	Half & full duplex	Half & full duplex Echoplex
Compatability	TTY 33/35, IBM 2260/65	TTY 33/35	—
Other	Computer interfaces available	—	—

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

4-Color Display

INSTALLATIONS

ALPHANUMERIC CRT DISPLAYS

Manufacturer	Digital Equipment Corp. 146 Main St. Maynard, MA 01754 (617) 897-5111	Digital Equipment Corp. 146 Main St. Maynard, MA 01754 (617) 897-5111	Digital Info. Systems P.O. Box 88580 Seattle, WA 98188 (206) 228-2526
Model	VT05	VT06	1017

Evaluation Guide Procedure VII-1.A NRC Identification No.

PERFORMANCE DATA

Display			
Size	10x7.5in (25.4x19cm)	10x7.5in (25.4x19cm)	10x12in (25.4x30.5cm)
# Char.	1,440	1,800	1,024
Char./Line	72	72	64
# Lines	20	25	16
Char. Set	ASCII	64 ASCII	ASCII
Char. Form	5x7 Dot	5x7 Dot	5x7 Dot
Data Entry			
Insert/Delete	—	—	Char. & line (std)
Tab	Horz (std)	Horz (std)	Horz (std)
Formatting	—	—	—
Page Roll	Standard	Standard	Optional
Split Screen	—	—	Optional
Other	Programmable cursor — erase to end of line & screen	Programmable cursor — erase to end of line & screen	—
Communications			
Interface	RS232B current loop	—	Acoustic coupler, modem
Data Rate	110/150/300bps	1,100 to 24,000bps	110 to 9,600bps
Mode	Half & full duplex	Half & full duplex	Half & full duplex
Compatability	TTY 33/35	TTY 33/35	—
Other	—	—	—

PHYSICAL DATA

Environment			
Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA			
Price	Information not obtained	Information not obtained	Information not obtained

NOTES

	Options: LP	Options: LP, CT

INSTALLATIONS

ALPHANUMERIC CRT DISPLAYS

Manufacturer	Genesis One Computer Corp. New York, NY 10017	GTE/Information Systems Anaheim, CA 92807	Hazeltine Corporation Greenlawn, NY 11740 (516) 549-8800
Model	G77	IS/7000	2000
Evaluation Guide Procedure VII-1.A	NRC Identification No.		

PERFORMANCE DATA

Display			
Size	7x10in (17.8x25.4cm)	6x9in (15.2x22.9cm)	Information not available
# Char.	Information not available	Information not available	1,998
Char./Line	80	80	74
# Lines	24	24	27
Char. Set	95 (incl lower case)	67 (not incl lower case)	96 ASCII
Char. Form	5x7	Dot	5x7 Dot
Data Entry			
Insert/Delete	Char	Char	Char & line (std)
Tab	Horz & vert	Horz	Horz & vert (std)
Formatting	Information not available	Information not available	Standard
Page Roll	Information not available	Information not available	Standard
Split Screen	Standard	Standard	Standard
Other	Cursor moved/read by CPU, blinking cursor-field protect	Field protect-security keylock	—
Communications			
Interface	RS232C	RS232C, IBM channel	RS232B
Data Rate	7,200bps sync	9,600bps sync	110 to 1,200bps
Mode	—	Half duplex	Half & full duplex, Echoplex
Compatability	IBM 3272-2	GTE/IS controller	TTY 33/35
Other	—	—	—

PHYSICAL DATA

Environment			
Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Clustering up to 32 terminals	Programmable by mfg Clustering, 24 terminals	Options: LP, CT

INSTALLATIONS

ALPHANUMERIC CRT DISPLAYS

Manufacturer	Honeywell Info. Systems 200 Smith St. Waltham, MA 02154 (617) 891-8400	Honeywell Info. Systems 200 Smith St. Waltham, MA 02154 (617) 891-8400	Honeywell Info. Systems 200 Smith St. Waltham, MA 02154 (617) 891-8400
Model	VIP 765	VIP 775	VIP 785

Evaluation Guide Procedure VII-1.A NRC Identification No.

PERFORMANCE DATA

Display			
Size	6.25x9in (15.8x22.9cm)	6.25x9in (15.8x22.9cm)	6.25x9in (15.8x22.9cm)
# Char.	1,012	1,012	2,024
Char./Line	46	46	92
# Lines	22	22	22
Char. Set	62 ASCII	62 ASCII (see notes)	62 ASCII (see notes)
Char. Form	5x7 Dot	5x7 Dot	5x7 Dot
Data Entry			
Insert/Delete	Information not available	Information not available	Information not available
Tab	Horz & vert (std)	Horz & vert (std)	Horz & vert (std)
Formatting	Standard	Standard	Standard
Page Roll	Information not available	Information not available	Information not available
Split Screen	Standard	Standard	Standard
Other	—	—	—
Communications			
Interface	RS232B	RS232B	RS232B
Data Rate	1,200bps	2,000/2,400bps	2,000/2,400/4,800bps
Mode	Half duplex	Half duplex	Half duplex
Compatability	Information not available	Information not available	Information not available
Other	—	—	—

PHYSICAL DATA

Environment			
Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Numeric only keyboard (std)

INSTALLATIONS

ALPHANUMERIC CRT DISPLAYS

Manufacturer	Hypertech Corp. 7343 W. Wilson Ave. Harwood Hgts., IL 60656 (312) 867-4200	IBM Corporate Hdqtrs. Armonk, NY 10504 (914) 765-1900	IBM Corporate Hdqtrs. Armonk, NY 10504 (914) 765-1900
Model	GTU-1	2260 and 2848	2265 and 2845

Evaluation Guide Procedure VII-1.A NRC Identification No.

PERFORMANCE DATA

Display			
Size	6x9in (15.2x22.9cm)	Information not available	Information not available
# Char.	300	240/480/960	960
Char./Line	25	40/80	64/80
# Lines	12	6/12	15/12
Char. Set	64 ASCII	64 EBCDIC	64 ASCII
Char. Form	5x7 Dot	Information not available	Information not available
Data Entry			
Insert/Delete	Information not available	Information not available	Char & line (opt)
Tab	Horz & vert (std)	Information not available	Horz & vert (opt)
Formatting	Standard	Information not available	Standard
Page Roll	Information not available	Information not available	Information not available
Split Screen	Standard	Information not available	Information not available
Other	—	Erase to end of line or page	Erase to end of line or page
Communications			
Interface	RS232B, current loop, acoustic coupler, modem	Information not available	Information not available
Data Rate	110 to 2,400bps	2,400bps	1,200/2,400bps
Mode	Half-duplex	—	—
Compatability	TTY 33/35	Information not available	Information not available
Other	—	IBM 360 interface	IBM 360 interface

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Options: LP, CT	Multi-terminal system, One 2848 controls up to 24 units Options: LP	Options: LP

INSTALLATIONS

ALPHANUMERIC CRT DISPLAYS

Manufacturer	IBM Corp. Corporate Hdqtrs. Armonk, NY 10504 (914) 765-1900	Informer Inc. 2218 Cotner Ave. Los Angeles, CA 90064 (213) 477-4216	Infoton Second Ave. Burlington, MA 01803 (617) 272-6600
Model	3270	302 Series	Vista Basic

Evaluation Guide Procedure VII-1.A NRC Identification No.

PERFORMANCE DATA

Display			
Size	Information not available	5x5in (12.7x12.7cm)	10x8in (25.4x20.3cm)
# Char.	480/1,920	Information not available	1,280
Char./Line	40/80	32	32/64
# Lines	12/24	16	10/20
Char. Set	Information not available	64 (lower case opt)	64 ASCII
Char. Form	7x9 Dot	5x7 Dot	5x7 Dot
Data Entry			
Insert/Delete	Char. & line (std)	Information not available	Information not available
Tab	Horz & vert (std)	Horz & vert	Information not available
Formatting	Standard	Information not available	Information not available
Page Roll	Information not available	Information not available	Standard
Split Screen	Information not available	Standard	Information not available
Other	Light pen repeat char erase to end of line or page	Polling cursor moved by CPU, field protect	—
Communications			
Interface	Information not available	RS232C loop, parallel	RS232B, current loop, modem
Data Rate	4,800bps to 800,000cps	9,600bps Async	4,800bps
Mode	—	Half & full duplex	Half & full duplex
Compatability	Information not available	Information not available	TTY 33/35
Other	IBM 360/370 interface	—	—

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Multi-terminal system of up to 32 units Options: LP	Clustering up to 127 terminals

INSTALLATIONS

ALPHANUMERIC CRT DISPLAYS

Manufacturer	Infoton Second Ave. Burlington, MA 01803 (617) 272-6600	Infoton Second Ave. Burlington, MA 01803 (617) 272-6600	ITT/Data Equipment & Systems Division E. Union Ave. E. Rutherford, NJ 07073 (201) 935-3900
Model	Vista Standard	Vista Plus	3100A Alphascope
Evaluation Guide Procedure VII-1.A	NRC Identification No.		

PERFORMANCE DATA

Display			
Size	10x8in (25.4x20.3cm)	10x8in (25.4x20.3cm)	5x7.5in (12.7x19cm)
# Char.	1,600	1,600	1,360
Char./Line	40/80	40/80	80
# Lines	10/20	10/20	17
Char. Set	64 ASCII (see notes)	64 ASCII (see notes)	64 ASCII
Char. Form	7x9 Dot	5x7 Dot	5x7 Dot
Data Entry			
Insert/Delete	Line (std)	Char & line (std)	Char & line (std)
Tab	Information not available	Horizontal (std)	Horizontal (opt)
Formatting	Information not available	Standard	Optional
Page Roll	Standard	Standard	Information not available
Split Screen	Information not available	Information not available	Information not available
Other	Lower case, light pen (opt)	Lower case, light pen (opt)	—
Communications			
Interface	RS232B, current loop, parallel computer, modem	RS232B, current loop, parallel computer, modem	RS232B, parallel computer
Data Rate	4,800bps	Information not available	1,200 to 20,000bps
Mode	Half & full duplex	Information not available	Half duplex
Compatability	TTY	—	IBM 2260/65
Other	—	—	—

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Numeric only keyboard (opt)	Numeric only keyboard (opt)	Options: LP

INSTALLATIONS

ALPHANUMERIC CRT DISPLAYS

Manufacturer	Lear Siegler/ Electronic Instruments Div. 714 No. Brookhurst St. Anaheim, CA 92803 (714) 774-1010	Marconi-Elliot Comp. Systems Elstree Way, Borehamwood Hertfordshire, UK 01-953-2030	Mark Computer Systems One Paterson Place Garden City, NY 11530 (516) 746-5885
Model	7700	Series 4000	DD-70

Evaluation Guide Procedure VII-1.A NRC Identification No.

PERFORMANCE DATA

Display			
Size	12in (30.5cm) diag	Information not available	6x8.33in (15.2x20cm)
# Char.	1,000/2,000	576/1,152	1,024
Char./Line	40/80	32/72	64
# Lines	25	16	16
Char. Set	64 ASCII (see notes)	64 ASCII	64 ASCII
Char. Form	5x7 Dot	Information not available	5x7 Dot
Data Entry			
Insert/Delete	Char. & line (std)	Char. & line (std)	Char. & line (opt)
Tab	Horz & vert (std)	Horz & vert (std)	Horz & vert (opt)
Formatting	Standard	Standard	Optional
Page Roll	Standard	Information not available	Information not available
Split Screen	Standard	Information not available	Information not available
Other	Programmable cursor — wrap around (std)	Repeat character	—
Communications			
Interface	RS232B current loop, parallel computer	RS232B, modem	RS232B, current loop, modem
Data Rate	120,000bps	600 to 4,800bps	100 to 50,000bps
Mode	H & F duplex, Echoplex	—	Half duplex
Compatability	Information not available	Information not available	TTY
Other	—	—	—

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

96 ASCII (opt)

Multi-terminal system

INSTALLATIONS

ALPHANUMERIC CRT DISPLAYS

Manufacturer	Megadata 10 Evergreen Place Deer Park, NY 11729 (516) 667-2900	Micro Application Systems Box 213 960 Darwin Dr. Grand Forks, ND 58201	Microtech Data Systems Inc. 1141 E. Janis St. Carson, CA 90746
Model	S/R 1000	T1	Micro 2000
Evaluation Guide Procedure VII-1.A	NRC Identification No.		

PERFORMANCE DATA

Display			
Size	9x9in (22.9x22.9cm)	12in (30.5cm) diag	12in (30.5cm) diag
# Char.	1,728	Information not available	Information not available
Char./Line	72	80	80
# Lines	24	24	24
Char. Set	ASCII: EBCDIC	64/96 (incl lower case)	128 (incl lower case)
Char. Form	5x7 Dot	5x7 Dot	5x7/7x9 Dot
Data Entry			
Insert/Delete	Char & line (opt)	Char & line	Char
Tab	Horz & vert (std)	Horz & vert	Horz & vert
Formatting	Optional	Information not available	Information not available
Page Roll	Standard	Information not available	Information not available
Split Screen	Optional	Information not available	Information not available
Other	Blinking, intensified character	Cursor moved/ready by CPU, field protect, blink	Stand-alone operation, auto-answer, polling, cursor move/read by CPU, field protect, blink
Communications			
Interface	RS232B, current loop, parallel computer, modem	RS232C, current loop	RS232C parallel
Data Rate	110 to 9,600bps	9,700bps async	9,600bps sync/async
Mode	Half & full duplex, Echoplex	Half & full duplex	Half & full duplex
Compatability	TTY 28/33 IBM 2260/65, remote monitors	Information not available	Information not available
Other	—	—	—

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Four-color display (opt)	Programmable by mfg	Programmable by user, mfg or CPU Built-in coupler

INSTALLATIONS

ALPHANUMERIC CRT DISPLAYS

Manufacturer	NCR Dayton, OH 45409 (513) 449-2000	Olivetti One Park Ave. New York, NY 10016 (212) 371-5500	Omrom R & D 432 Toyama Drive Sunnyvale, CA 94086
Model	795	TCV 260	8000
Evaluation Guide Procedure VII-1.A		NRC Identification No.	

PERFORMANCE DATA

Display			
Size	7.5x9.25in (19x23cm)	12in (30.5cm) diag	15in (38.1cm) diag
# Char.	1,024	1,024	Information not available
Char./Line	52/64	64	80
# Lines	40/32	16	24
Char. Set	64 ASCII	64 (see notes)	128/224 (incl lower case)
Char. Form	Stroke	5x7 Dot	5x9 (w/half shift)
Data Entry			
Insert/Delete	Char. & line (std)	Char. & line (std)	Char. & line
Tab	Horz & vert (std)	Horizontal (std)	Horz & vert
Formatting	Standard	Information not available	Information not available
Page Roll	Information not available	Information not available	Information not available
Split Screen	Optional	Information not available	Information not available
Other	—	Blinking	Stand-alone operation auto-answer, polling field protects blinking
Communications			
Interface	RS232B	RS232B	RS232C Loop, parallel
Data Rate	1,800bps	15,000cps	9,600bps sync/async
Mode	Half & full duplex	Half duplex	Half & full duplex
Compatability	Information not available	IBM 2260/65	Information not available
Other	—	—	—

PHYSICAL DATA

Environment			
Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Multi-terminal system Options: LP	Numberic only keyboard (std)	Programmable by user, mfg or CPU

INSTALLATIONS

ALPHANUMERIC CRT DISPLAYS

Manufacturer	Pertic Business Systems 17112 Armstrong Ave. Santa Ana, CA 92705	Philco-Ford 1002 Gemini Ave. Houston, TX 77058 (713) 488-1270	Randal Data Systems, Inc. 365 Maple Ave. Torrance, CA 90503
Model	7100	D-22-1232	Link-100

Evaluation Guide Procedure VII-1.A NRC Identification No.

PERFORMANCE DATA

Display			
Size	5.5x8.25in (14x20cm)	Information not available	12x12in (30.5x30.5cm)
# Char.	Information not available	Information not available	Information not available
Char./Line	80	48	80
# Lines	24	32	24
Char. Set	64/96 (incl lower case)	50 ASCII	64 (not incl lower case)
Char. Form	7x9 Dot	11x12 Dot	Matrix
Data Entry			
Insert/Delete	Char. & line	Line (std)	Char. & line
Tab	Horz & vert	Information not available	Horz & vert
Formatting	Information not available	Information not available	Information not available
Page Roll	Information not available	Information not available	Information not available
Split Screen	Standard	Information not available	Information not available
Other	Stand-alone operation, polling, cursor moved/ read by CPU, field protect, blink	Blinking (std)	Stand-alone operation, auto-answer, polling, CPU move/ read, cursor, blinking
Communications			
Interface	RS232C, loop, parallel	RS232B	RS232C
Data Rate	9,600bps sync/async	1,200bps	9,600bps sync/async
Mode	Half & full duplex	Half duplex	Full & half duplex
Compatability	Information not available	IBM 2701	Information not available
Other	—	—	—

PHYSICAL DATA

Environment			
Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Programmable by mfg. Options: Built-in modem	Programmable by user

INSTALLATIONS

ALPHANUMERIC CRT DISPLAYS

Manufacturer	RCA Information Systems Div. Marlborough, MA 01752 (617) 485-6000	RCA Information Systems Div. Marlborough, MA 01752 (617) 485-6000	Research Inc. P.O. Box 24084 Minneapolis, MN 55424 (612) 941-3300
Model	8750	8752	Teleray 3300
Evaluation Guide Procedure VII-1.A	NRC Identification No.		

PERFORMANCE DATA

Display			
Size	6x8.5in (15.2x21.6cm)	6x8.5in (15.2x21.6cm)	Information not available
# Char.	1,050	1,134	960/1,920
Char./Line	81	81	40/72/80
# Lines	29	29	12,24
Char. Set	96 ASCII	96 ASCII	64 ASCII
Char. Form	Monoscope	Monoscope	5x7 Dot
Data Entry			
Insert/Delete	Char. & line (std.)	Char. & line (std.)	Char. (std.)
Tab	Horz. & vert (opt.)	Horz. & vert (opt.)	Information not available
Formatting	Optional	Optional	Information not available
Page Roll	Information not available	Information not available	Information not available
Split Screen	Standard	Standard	Information not available
Other	—	—	—
Communications			
Interface	RS232B Parallel computer	RS232B	RS232C, current loop
Data Rate	2,400bps	300 to 2,400bps	110 to 2,400bps
Mode	Full duplex	Half & full duplex	Half & full duplex
Compatability	Information not available	Information not available	TTY 33
Other	IBM 360/370 Coupler	IBM 360/370 Coupler	

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

INSTALLATIONS

ALPHANUMERIC CRT DISPLAYS

Manufacturer	Research Inc. P.O. Box 24084 Minneapolis, MN 55424 (612) 941-3300	Research Inc. P.O. Box 24084 Minneapolis, MN 55424 (612) 941-3300	Research Inc. P.O. Box 24084 Minneapolis, MN 55424 (612) 941-3300
Model	Teleray 3541	Teleray 3511	Teleray 3711
Evaluation Guide Procedure VII-1.A	NRC Identification No.		

PERFORMANCE DATA

Display			
Size	12in (30.5cm) diag.	12in (30.5cm) diag. 15in (38.1cm) opt.	12in (30.5cm) diag. 15in (38.1cm) opt.
# Char.	1,920	1,920	1,920
Char./Line	40/80	40/80	40/80
# Lines	24	24	24
Char. Set	96 ASCII	96 ASCII	128 ASCII
Char. Form	5x7 Dot	5x7 Dot	5x9 Dot
Data Entry			
Insert/Delete	Char & line	Char & line	Char & line
Tab	Horz. (1) std. 2, 4, 8, 16 opt.	Horz. (1) std. 2, 4, 8, 16 opt.	Horz. (1) std. 2, 4, 8, 16 opt.
Formatting	Information not available	Information not available	Information not available
Page Roll	Standard	Standard	Standard
Split Screen	Information not available	Information not available	Information not available
Other	Bottom line entry	Bottom line entry Numeric pad (opt.)	Bottom line entry Numeric pad (opt.)
Communications			
Interface	RS232, current loop, TTL	RS232, current loop, TTL	RS232, current loop, TTL
Data Rate	50 to 9,600bps	50 to 9,600bps	50 to 9,60^
Mode	Half & full duplex	Half & full duplex	Half & full duplex
Compatability	TTY ASR33	TTY ASR33	TTY ASR33
Other	Video output (RS-170) (opt.)	Video output (RS-170) (opt.)	Video output (RS-170) (opt.)

PHYSICAL DATA

Environmental Characteristics	40 to 115F (5 to 45C)	40 to 115F (5 to 45C)	40 to 115F (5 to 45C)
Weight	45lb (20kg)	52lb (24kg)	52lb (24kg)
Size	Information not obtained	Information not obtained	Information not obtained
Power	65W	70W	73W

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

	Options: LP	Options: 15in (38.1cm) CRT, LP	Options: 15in (38.1cm) CRT, LP

INSTALLATIONS

ALPHANUMERIC CRT DISPLAYS

Manufacturer	Research Inc. P.O. Box 24084 Minneapolis, MN 55424 (612) 941-3300	Research Inc. P.O. Box 24084 Minneapolis, MN 55424 (612) 941-3300	Sanders Data Systems Daniel Webster Hwy. Nashua, NH 03060 (603) 885-6660
Model	Teleray 3811	Teleray 3931	622

Evaluation Guide Procedure VII-1.A NRC Identification No.

PERFORMANCE DATA

Display			
Size	12in (30.5cm) diag., 15in (38.1cm) opt.	15in (38.1cm) diag.	9.5x7.5in (24x19cm)
# Char.	1,920	1,920	1,024
Char./Line	40/80	40/80	64
# Lines	24	24	32
Char. Set	128 ASCII	128	64 ASCII
Char. Form	5x9 Dot	5x9 Dot	Stroke
Data Entry			
Insert/Delete	Char. & line	Char. & line	Information not available
Tab	Horz (1) std. 2,4,8, 16 opt.	Horz (1) std. 2,4,8, 16 opt.	Horz. & vert. (std.)
Formatting	Information not available	Information not available	Standard
Page Roll	Standard	Standard	Information not available
Split Screen	Information not available	Information not available	Information not available
Other	Top of screen entry Numeric pad (opt.)	Bottom line entry Numeric pad (opt.)	—
Communications			
Interface	RS232, current loop, TTL	RS232, current loop, TTL	RS232 B
Data Rate	50 to 9,600bps	50 to 9,600bps	2,400bps
Mode	Half & full duplex	Half & full duplex	Half & full duplex
Compatability	TTY ASR33	TTY ASR33	TTY
Other	Video output (RS-170) (opt.)	Video output (RS-170) (opt.) APL/ASCII switch	—

PHYSICAL DATA

Environment			
Characteristics	40 to 115F (5 to 45C)	40 to 115F (5 to 45C)	Information not obtained
Weight	53lb (24kg)	68lb (31kg)	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	76W	78W	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Options: UC only; 15in (38.1cm) CRT, LP	Options: LP	Up to 16 units may be clustered using 716 serial distributor. Options: LP

INSTALLATIONS

ALPHANUMERIC CRT DISPLAYS

Manufacturer	Sanders Data Systems Daniel Webster Hwy. Nashua, NH 03060 (603) 885-6660	Scientific Measurement Systems 26 Olney Ave. Cherry Hill, NJ 08003	Spiras Systems 332 Second AVe. Waltham, MA 02154 (617) 891-7300
Model	720	SMS 1920	IRAScope TE

Evaluation Guide Procedure VII-1.A NRC Identification No.

PERFORMANCE DATA

Display			
Size	9.5x7.5in (24x19cm)	6x10in (15.2x25.4cm)	7x9.5in (17.8x24.1cm)
# Char.	1,024	Information not available	1,024/4,608
Char./Line	52/64	80	80
# Lines	40/32	24	32
Char. Set	64 ASCII	95 (incl. lower case)	124 ASCII
Char. Form	Stroke	Matrix	Monoscope
Data Entry			
Insert/Delete	Char. & line (std.)	Char. & line	Char & line (std.)
Tab	Horz. & vert. (std.)	Horizontal	Horz & vert. (std.)
Formatting	Standard	Information not available	Standard
Page Roll	Information not available	Information not available	Standard
Split Screen	Optional	Information not available	Information not available
Other	Blinking, multi-block formatting (std.)	Stand-alone operation CPU move/read cursor, field protect, reverse char.	Blinking, lower case (std.)
Communications			
Interface	RS232B, parallel computer	RS232C, current loop	RS232B, modem
Data Rate	9,600bps	19,200bps async	2,400bps
Mode	Half & full duplex	Half & full duplex	Half duplex
Compatability	Information not available	Information not available	Information not available
Other	—	—	—

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

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COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

	Options: LP, PT	Options: LP, PT, CT

INSTALLATIONS

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ALPHANUMERIC CRT DISPLAYS

Manufacturer	SYS Computer 17-25 DiCarolis Court Hackensack, NJ 07601 (201) 488-0300	Sycor 117 No. First St. Ann Arbor, MI 48108 (313) 769-1500	TEC 9800 No. Oracle Tucson, AZ 85704 (602) 297-1111
Model	Editerm	340	410, 420 and 430

Evaluation Guide Procedure VII-1.A NRC Identification No.

PERFORMANCE DATA

Display			
Size	Information not available	5.5x4.75in (14x12cm)	9x6.5in (22.9x16.5cm)
# Char.	Information not available	576	1,000
Char./Line	80	64	50
# Lines	24	9	20
Char. Set	128 ASCII: EBCDIC	64 ASCII	64 ASCII
Char. Form	5x7 Dot	5x7 Dot	5x7 Dot
Data Entry			
Insert/Delete	Char. & line (std.)	Information not available	Char. & line (std.)
Tab	Horz. & vert. (std.)	Horz. & vert. (std.)	Horz. & vert. (std.)
Formatting	Standard	Standard	Standard
Page Roll	Standard	Optional	Standard
Split Screen	Optional	Information not available	Information not available
Other	—	—	Blinking, erase to end of line or page (std.)
Communications			
Interface	RS232B, current loop, parallel computer acoustic coupler, modem	RS232C	RS232C (420, 430), current loop (430)
Data Rate	9,600bps - 100,000cps	1,200 to 2,400bps	110 to 9,600bps
Mode	Half & full duplex, Echoplex	Half duplex	Half & full duplex Echoplex (430) (see notes)
Compatability	TTY 33/37	Information not available	TTY 33/35 (420,430)
Other	—	—	—

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

4K to 32K internal controller Options: LP, PT, CT, MT, DD	Intelligent terminal with up to 12Kx8-bit memory Options: LP, CT, MT	Half duplex (410) Half & full duplex (420)

INSTALLATIONS

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ALPHANUMERIC CRT DISPLAYS

Manufacturer	TEC 9800 No. Oracle Tucson, AZ 85704 (602) 297-1111	TEC 9800 No. Oracle Tucson, AZ 85704 (602) 297-1111	Teleran Communications Corp. 1032 Mamaroneck Ave. Mamaroneck, NY 10543
Model	415, 425 and 435	440	P-1800

Evaluation Guide Procedure VII-1.A NRC Identification No.

PERFORMANCE DATA

Display			
Size	9x6.5in (22.9x16.5cm)	9x6.5in (22.9x16.5cm)	6.6x 4.5in (17x11.4cm)
# Char.	1,920	1,728/1,920	Information not available
Char./Line	80	72/80	44
# Lines	24	24	14
Char. Set	64 ASCII	64 ASCII	127 (incl. lower case)
Char. Form	5x7 Dot	5x7 Dot	Matrix
Data Entry			
Insert/Delete	Char. & line (std.)	Information not available	Char & line
Tab	Horz. & vert (std.)	Information not available	Horizontal
Formatting	Standard	Information not available	Information not available
Page Roll	Standard	Information not available	Information not available
Split Screen	Information not available	Information not available	Information not available
Other	Blinking, erase to end of line or page (std.)	—	Stand-alone operation
Communications			
Interface	RS232C (425, 435), current loop (435)	RS232C current loop	RS232C, current loop
Data RAte	110 to 9,600bps	110/300bps	6,600bps async.
Mode	Half & full duplex, Echoplex (435) (see notes)	Half duplex, Echoplex	Half duplex
Compatability	TTY 33/35 (425, 435)	TTY 33/35	Information not available
Other	—	TTL interface	—

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

	Half duplex (415). Half & full duplex (425)	Programmable by mfg. or CPU

INSTALLATIONS

ALPHANUMERIC CRT DISPLAYS

Manufacturer	Teletype Corp. 5555 Touhy Ave. Skokie, IL 60076 (312) 982-2500	Terminal Communications P.O. Box 27288 Raleigh, NC 27611 (919) 834-5251	Terminal Communications P.O. Box 27288 Raleigh, NC 27611 (919) 834-5251
Model	40	TC-62	TC-70
Evaluation Guide Procedure VII-1.A		NRC Identification No.	

PERFORMANCE DATA

Display			
Size	5.25x11.25in (13.3x28.6cm)	12in (30.5cm) diag.	12in (30.5cm)
# Char.	Information not available	512 to 1,024	512/1,000
Char./Line	80	32/40/50/64/80	32/50
# Lines	24	20/16/12/10	16/20
Char. Set	94 (incl lower case)	64 ASCII	64 EBCDIC
Char. Form	Dot	5x7 Dot	5x7 Dot
Data Entry			
Insert/Delete	Char. line	Char. (std.)	Char. (std.)
Tab	Horizontal	Horizontal (std.)	Horizontal (std.)
Formatting	Information not available	Standard	Standard
Page Roll	Information not available	Information not available	Information not available
Split Screen	Information not available	Information not available	Standard
Other	Stand-alone operation, auto-answer, field protect, scroll, blink	—	—
Communications			
Interface	RS232C, current loop	RS232B, modem	RS232B, modem
Data Rate	4,800bps async.	135 to 2,400bps	135 to 2,400bps
Mode	Half & full duplex	Half & full duplex	Half & full duplex
Compatability	Information not available	Information not available	Information not available
Other	—	Type 1 IBM 2740 software support	Type 1 IBM 2740 software support

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

	Options: LP	Options: LP

INSTALLATIONS

ALPHANUMERIC CRT DISPLAYS

Manufacturer	Trivex 2201 North Glassel St. Orange, CA 92665 (714) 637-6520	Tycom Systems Corp. 26 Just Road Fairfield, NJ 07006	Ultronic Systems Mt. Laurel Ind. Pk. Moorestown, NJ 08057 (609) 235-7300
Model	40/30 System	VWP	Videomaster 7000
Evaluation Guide Procedure VII-1.A		NRC Identification No.	

PERFORMANCE DATA

Display			
Size	8.5x11in (21.6x28cm)	Information not available	9.5x7.5in (24x19cm)
# Char.	240/480/960	Information not available	960
Char./Line	40/80	80	64/80
# Lines	6/12	20	12/15
Char. Set	64 ASCII	Information not available	64 ASCII
Char.Form	5x7 Dot	5x9 Dot	5x7 Dot
Data Entry			
Insert/Delete	Char. line (std.)	Char. & line	Information not available
Tab	Horizontal (std.)	Horizontal	Horizontal (std.)
Formatting	Optional	Information not available	Information not available
Page Roll	Information not available	Information not available	Information not available
Split Screen	Optional	Information not available	Information not available
Other	Erase to end of line & page, repeat char. (std.)	Stand-alone operation, built-in coupler, move/read cursor by CPU, field protect, blink, underline	—
Communications			
Interface	RS232B, modem	RS232C loop, parallel	RS232B
Data Rate	9,600bps	50,000bps sync/9,600bps	1,200 to 2,400bps
Mode	Half duplex	Half & full duplex	Half duplex
Compatability	IBM 2260/65	Information not available	IBM 2260/65
Other	Compatible with 2260/2848	—	—

PHYSICAL DATA

Environment			
Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

...minal system of up... ...ious Options: LP, C...	Programmable by user, mfg. or CPU	Options: LP

INSTALLATIONS

ALPHANUMERIC CRT DISPLAYS

Manufacturer	Ultronic Systems Mt. Laurel Ind. Pk. Moorestown, NJ 08057 (609) 235-7300	Unicom 1275 Bloomfield Ave. Fairfield, NJ 07006 (201) 228-1696	Unicomp, Inc. 18219 Parthenia St. Northridge, CA 91324 (213) 886-7722
Model	Videomaster 7700	CT-3000	522

Evaluation Guide Procedure VII-1.A NRC Identification No.

PERFORMANCE DATA

Display			
Size	9.5x7.5in (24x19cm)	Information not available	12x9in (30.5x22.9cm)
# Char.	240/480/960/1,920	400	1,998
Char./Line	40/64/80	40	74
# Lines	6/12/15/24	10	27
Char. Set	64 ASCII	ASCII	128 ASCII
Char.Form	5x7 Dot	5x7 Dot	5x7 Dot
Data Entry			
Insert/Delete	Information not available	Char. (std.) line (opt.)	Char. & line (std.)
Tab	Horizontal (std.)	Horz. & vert. (opt.)	Horz. & vert. (std.)
Formatting	Standard	Standard	Information not available
Page Roll	Information not available	Standard	Information not available
Split Screen	Information not available	Standard	Information not available
Other	—	Repeat char. (std.)	Scrolling (std.)
Communications			
Interface	RS232B	Parallel computer	RS232B
Data RAte	1,200 to 9,600bps	20,000bps	1,100 to 9,600bps
Mode	Half duplex	—	Half & full duplex
Compatability	IBM 2260/65	Information not available	TTY 33/35
Other	—	—	—

PHYSICAL DATA

Environment			
Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Multi-terminal system of up to 24 displays Options: LP	Options: LP	Options: LP, CT

INSTALLATIONS

ALPHANUMERIC CRT DISPLAYS

Manufacturer	Univac/Div. of Sperry Rand P.O. Box 500 Blue Bell, PA 19422 (215) 825-2560	Video Data Systems Corp. 657 Old Willets Path Hauppage, NY 11787	Video Systems Corp. 7300 No. Crescent Blvd. Pennsauken, NJ 08110 (609) 665-6888
Model	Uniscope 100	C.G. 500	VST-1200 and VST-3712

Evaluation Guide Procedure VII-1.A NRC Identification No.

PERFORMANCE DATA

Display			
Size	5x10in (12.7x25.4cm)	Any color video	Information not available
# Char	960/1,024	Information not available	1,296
Char./Line	64/80	32	72
# Lines	12/16	8	18
Char. Set	64 ASCII	32 Chars.	64 ASCII (see notes)
Char. Form	Stroke	10x14 Dot	5x7 Dot
Data Entry			
Insert/Delete	Char. & line (std.)	Char. & line	Char & line (opt.)
Tab	Horz. & vert. (std.)	Information not available	Horz. & vert. (opt.)
Formatting	Standard	Information not available	Optional
Page Roll	Standard	Information not available	Optional
Split Screen	Standard	Information not available	Optional
Other	—	Stand-alone operation, blinking color, (composite video output)	Batch transmit, lower case (std.)
Communications			
Interface	RS232B	RS232C	RS232B, current loop, parallel computer, modem
Data Rate	Up to 9,600bps	9,600bps async.	1,200bps
Mode	Half duplex	Half duplex	Half & full duplex, Echoplex
Compatability	Information not available	Information not available	TTY 33, minicomputer interfacing
Other	IBM 360 Compatible thru software	—	—

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Multiplex option for control of up to 16 terminals. Options: LP	Programmable by mfg.	96 (VST-3712) Options: LP, PT, CT

INSTALLATIONS

ALPHANUMERIC CRT DISPLAYS

Manufacturer	Video Systems Corp. 7300 No. Crescent Blvd. Pennsauken, NJ 08110 (609) 665-6688	Video Systems Corp. 7300 No. Crescent Blvd. Pennsauken, NJ 08110 (609) 665-6688	Wang Laboratories, Inc. 836 North St. Tewksbury, MA 01876 (617) 851-7311
Model	VST-2000 and VST-3720	VST-3770 and VST-7000	2200 and WCS Series

Evaluation Guide Procedure VII-1.A NRC Identification No.

PERFORMANCE DATA

Display			
Size	Information not available	Information not available	9x12in (22.9x30.5cm)
# Char.	2,592	7,776	Information not available
Char./Line	72	72	64
# Lines	18	18	16
Char.Set	64 ASCII (see notes)	96 ASCII (see notes)	128 (incl. lower case)
Char. Form	5x7 Dot	5x7 Dot	5x7 Matrix
Data Entry			
Insert/Delete	Char. & line (opt.)	Char. & line (opt.)	Char. & line
Tab	Horz. & vert. (opt.)	Horz. & vert. (opt.)	Horz. & vert.
Formatting	Optional	Optional	Information not available
Page Roll	Optional	Optional	Information not available
Split Screen	Optional	Optional	Information not available
Other	Batch transmit, lower case (std.)	Batch transmit, lower case (std.)	Stand-alone operation, auto-answer, polling
Communications			
Interface	RS232B, current loop parallel computer, modem	RS232B, current loop parallel computer, modem	RS232C
Data Rate	1,200bps	1,200bps	4,800bps sync./1,200bps
Mode	Half & full duplex, Echoplex	Half & full duplex, Echoplex	Half duplex
Compatability	TTY 33, minicomputer interfacing	TTY 33, minicomputer interfacing	—
Other	—	—	Information not available

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

96 (VST-3720) Options: LP, PT, CT	64 (VST-7000) Options: LP, PT, CT	Programmable by user mfg. or CPU

INSTALLATIONS

ALPHANUMERIC CRT DISPLAYS

Manufacturer	Wiltek, Inc. Glover Ave. Norwalk, CT 06852 (203) 853-7400	Wintek Corporation North 9th St. Lafayette, IN 47904	Wyle Computer Products 128 Maryland St. El Segundo, CA 90245 (213) 678-4251
Model	SEries 11 - Model 502	B-R-B Video Terminal	8260

Evaluation Guide Procedure VII-1.A NRC Identification No.

PERFORMANCE DATA

Display			
Size	15in (38.1cm)	7x5in (17.8x12.7cm)	12in (30.5cm)
# Char.	Information not available	Information not available	960
Char./Line	82	80	80
# Lines	24	16	12
Char. Set	128 (incl lower case)	64 (not incl. lower case)	64 ASCII
Char. Form	7x9 Dot	Dot	5x7 Dot
Data Entry			
Insert/Delete	Char. & line	Information not available	Char. (std.)
Tab	Horz. & vert.	Information not available	Horizontal (std.)
Formatting	Information not available	Information not available	Information not available
Page Roll	Information not available	Information not available	Information not available
Split Screen	Information not available	Information not available	Information not available
Other	Stand-alone operation, auto-answer, polling, CPU move/read cursor, field protect	Stand-alone operation	Erase to end of page, repeat char. (std.)
Communications			
Interface	RS232C, parallel	RS232C, current loop	RS232B, parallel computer, modem
Data Rate	9,600bps sync, async.	9,600bps sync.	1,200 to 2,400bps
Modem	Half & full duplex	Half & full duplex	Half & full duplex
Compatability	Information not available	Information not available	IBM 2260/65
Other	—	—	—

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Programmable by user, mfg. or CPU, clustering up to 8 terminals
Options: Built-in modem

Options: LP

INSTALLATIONS

ALPHANUMERIC CRT DISPLAYS

Manufacturer	Westinghouse Canada Ltd. P.O. Box 510 Hamilton, Ontario, Canada (416) 528 9811
Model	1600
Evaluation Guide Procedure VII-1.A	NRC Identification No.

PERFORMANCE DATA

Display	
Size	7x9in (17.8x22.9cm)
# Char.	1,600
Char./Line	80
# Lines	20
Char. Set	64 ASCII
Char. Form	5x7 Dot
Data Entry	
Insert/Delete	Char & line (std)
Tab	Horizontal (std)
Formatting	Standard
Page Roll	Standard
Split Screen	Standard
Other	—
Communications	
Interface	RS232C, current loop, parallel
Data Rate	Up to 9,600bps
Mode	Half & full duplex
Compatability	TTY
Other	—

PHYSICAL DATA

Environment Characteristics	Information not obtained
Weight	Information not obtained
Size	Information not obtained
Power	Information not obtained

COST DATA

Price	Information not obtained

NOTES

INSTALLATIONS

CRT ALPHANUMERIC WITH LIMITED GRAPHICS DISPLAYS

CRT alphanumeric with limited graphics displays form one category of general purpose cathode ray tube (CRT) displays. In some respects these CRT displays are similar to conventional television receivers. Generally a medium-short-persistence phosphor (50 microseconds to 100 millisconds) is used in the CRT, the same type of phosphor employed in conventional monochromatic TV receivers. In many cases the deflection circuitry for CRT alphanumeric displays with limited graphics is also the same as that used in the home TV sets.

A great variety of CRT displays, meeting many different requirements, is readily available. Their use in physical security systems is outlined in Volume VIII, Section 1 (Alarm Signalling Systems). CRT displays may interface with a computer or a similar display, or may operate as a keyboard-send-receive (KSR) or a receive-only (RO) teletype. The degree to which the displays meet requirements is determined by their intrinsic operational capabilities and the number and type of peripheral devices that support them or are supported by them. Such peripherals may include parallel displays, hard-copy output devices such as printers, and additional memory in the form of magnetic tape cassette record/playback devices.

The CRT display is comprised of five principal elements: The CRT with its associated display/deflection electronics; character-generating or display-forming circuitry; display memory; display control device(s); and circuitry for interfacing the display to external equipments. These elements may be either physically integrated into a single console/cabinet or interconnected by appropriate cables.

CRT alphanumeric displays with limited graphics use one of three deflection methods. Some use the video or raster scan deflection

method (the one used in conventional TV sets), in which an electron beam sweeps continuously from left to right through a series of 525 horizontal lines over the entire screen area. Some displays in this category have a capability of providing up to 1000 horizontal lines. All odd-numbered lines are scanned in one pass (one-sixtieth of a second), then the even-numbered lines are scanned in the next one-sixtieth of a second. This "interlace" of the scan lines completes the entire image or frame in one-thirtieth of a second. In a video or raster scan device the displayed characters are composed of dot patterns, which are formed with the electron beam "on" or unblanked for each dot. To permit greater flexibility in displaying various formats (variable character, word and line spacing), a substantial number of these displays use the sawtooth scan method. In this method the beam is deflected to a character position, then guided through a series of short horizontal and vertical strokes to define the characters. These may be comprised of dot or stroke patterns whose width, height, spacing and line-to-line spacing can be separately adjusted. In the third method, which uses programmed or directed beam scan, the beam is deflected to the appropriate positions on the screen under the direction of control logic. Once positioned, the character or graphics is fashioned as in the sawtooth scan method by a series of dots or strokes.

The character generating or display forming circuitry accepts binary coded characters from the local keyboard or communications interface and converts them into deflection signals. Basic character generators produce 64 upper-case alphanumeric characters including a few special symbols. Extended generators can form more characters as well as many combinations of special symbols, upper and lower case alphanumerics and line drawing graphics.

The memory in CRT displays provides storage for refreshing the display image and supports the display controls and external and local interfaces. The refresh memory is used to sustain the character image on the face of the CRT at a refresh rate sufficient to prevent

"flicker". The memory is usually large enough to store at least one "page" or screen full of data. If additional refresh storage is provided, the CRT display has a "paging" capability that permits the user to index lines that have rolled off the screen. The memory provides sufficient "buffering" to match the operational communications interface, and supports local cursor indexing, character/line insert/delete, tab, and format controls.

The CRT display control devices usually consist of a keyboard augmented with special function keys. The function keys provide cursor control and edit controls such as erase and insert/delete character/line. Some CRT displays for special applications may have limited or augmented key input capabilities. For example, some displays may only have a numeric key pad, or may have a numeric key pad in addition to a complete keyboard. Other display controls, similar to those of conventional TV sets, are display brightness and contrast. These are separate from the keyboard but are generally accessible to the operator.

The interfacing circuitry couples the CRT display to external devices. These interfaces may include a teletype-compatible current loop, or may conform to the electrical and logic specifications of the Electronic Industry Association (EIA) RS-232 standards, or may provide Diode Transistor Logic/Transistor-Transistor Logic (DTL/TTL) signal levels. Some displays have built-in data sets or modems (modulator-demodulator) which not only convert the transmitted binary character code voltages into audible tones or frequencies that are acceptable to the communications lines but also convert the received tones or frequencies to the binary signal needed by the display electronics. Many CRT displays provide switch-selectable input/output characteristics to permit a variety of data rate, electrical, and logic interfaces. Data transmission and reception between the display and interconnected devices can occur simultaneously (full-duplex mode) or alternatively in one direction at a time (half-duplex). Other trans-

mission modes are echoplex (keyboard-to-interconnected device simultaneously with interconnected device-to-display) and simplex (display-to-display only).

The performance parameters of CRT displays generally fall into one of two major interrelated areas: those that affect the "legibility" of the presented information, and those that are related to the particular operational mode(s) in which the display is employed.

Legibility performance depends on many factors, including the contrast between the displayed image and the background; screen luminance and ambient illuminance; display screen characteristics such as screen blemishes, ion and/or pattern burns, and screen noise which creates elemental variations in radiant emission across the screen; spot and character/symbol size and spacing; character/symbol flicker; and jitter of the displayed characters/symbols. Measures of overall legibility are determined by statistical methods. However, if the above aspects are satisfactory, and the operational mode performance needs are met, the display is generally suitable.

The operational performance capability also depends on the capabilities of the basic elements. Certain factors, however, have more impact than others in determining operational capability. Some of these are the size of the screen or viewing area, the number and types of characters/symbols displayed; interface characteristics such as data rates, signal levels and types; information transfer capabilities; block, page, line or character transfer rules and procedures. In addition, the physical operational environment in regards to ambient lighting and the position of the display (viewing angle/distance) with respect to the operator both impact on the overall performance of the CRT displays for their intended uses.

The degree of maintenance capability required depends on the complexity of the CRT display. The simpler displays (such as the KSR and RO teletype equivalent) depend on scheduled maintenance activities.

Faults or degradation in performance occurring between scheduled periods are usually detected visually, backed up by visual "trouble" light indications. The more sophisticated displays that are interconnected to a computer may have periodic offline/online diagnostic checks made automatically to indicate faults and confirm satisfactory operation. These diagnostics range in capability from simple "go-no-go" tests up to canned/simulated operational tests which exercise the entire display.

Inasmuch as the general purpose CRT displays are manufactured for a wide range of applications, tamper switches are not incorporated therein. However, the displays have incorporated provisions for reducing effects of RFI and EMI because they are normally collocated with other equipments, e.g., computers, memory devices.

CRT displays which are alphanumeric with limited graphics can display horizontal and vertical lines in conjunction with alphanumerics. Prescribed lines with associated alphanumeric notations, commonly termed a "format", usually are stored in the local display memory. This memory can be internal, or can be provided in the form of an interconnected device such as a magnetic tape or cassette transport. The format is recalled from memory by keyboard action (function key) and usually is protected in that it cannot be erased or altered by ordinary keying. Furthermore, format control allows the operator to transmit to other devices (printers and computers) the variable data entered at the keyboard. This feature may be identified as "split screen" by some display manufacturers. In addition to augmenting the memory capabilities to retain the format, the character generator element of the displays can generate line and bar symbols needed for establishing the format.

The display should be positioned so that the nominal viewing distance is 16 inches (41 cm) for a display screen size of 13 x 14 in (33 x 35.6 cm). If the viewing distance is much greater than 16 inches (41 cm), displays should be selected that have larger character/symbol

sizes, greater brightness ranges, and larger character, word and line spacing.

The cost of the CRT alphanumeric displays with limited graphics are a function of their capability. The purchase price of the units included in this Catalog range from $1,900 to about $15,000, and the cost for leasing ranges from $80 to about $500 per month. The average purchase price is about $6,000; the average lease is about $225 per month.

The data sheets for this category show that there are numerous options available for interfacing with appended devices. The options, as abbreviated, are: LP - Line/Page Printer; PC - Copier; PT - Paper Tape; CT - Cassette Transport; MT - Magnetic Tape Transport; and DD - Disk Drive. Another abbreviation used is HW for Hardwire feature.

ALPHANUMERIC WITH LIMITED GRAPHICS CRT DISPLAYS

Manufacturer	Applied Digital Data Systems 100 Marcus Blvd. Hauppauge, NY 11787 (516) 231-5400	Atlantic Technology Somers Point, NJ 08244 (609) 927-8003	Computek 143 Albany St. Cambridge, MA 02139 (617) 864-5140
Model	Consul 880	ATC 2000	100
Evaluation Guide Procedure VII-1.A	NRC Identification No.		

PERFORMANCE DATA

Display			
Size	5x8.5in (12.7x21.6cm)	7x9.5in (17.8x24.1cm)	7x9.33in (17.8x23.7cm)
# Char.	1,920 see notes	1,920	1,000
Char./Line	80	40/64/80	50
# Lines	24	3/6/12/15/24/20/48	20
Char. Set	64 ASCII	96 ASCII: EBCDIC	100 ASCII
Char. Form	5x7 dot	Stroke	Dot; stroke
Data Entry			
Insert/Delete	Char. & line (std.)	Char. (std.) line (opt.)	Char. & line (std.)
Tab	Horz. & vert (std.)	Horz. & vert (std.)	Horz. & vert (std.)
Formatting	Standard	Standard	Information not available
Page Roll	Standard	Optional	Optional
Split Screen	Information not available	Standard	Standard
Other	Blinking	Auto tab erase	Erase to end of page
Graphics Capability	160x72 rectangular elements w/alphanumerics superimposed	Continguous character	Limited graphics
Communications			
Interface	RS232B, current loop, parallel computer, acoustic coupler, modem	RS232B	RS232C, parallel computer
Data Rate	Up to 14,000bps	Up to 4,800bps	Up to 9,600bps
Mode	Half duplex	Half duplex	—
Compatability	TTY 33/35	IBM 2260/65	IBM 2260/65
Other	EIA Output/video mon.	—	—

PHYSICAL DATA

Environment			
Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

White background with black characters Options: LP, CT	Option: LP	Internal controller with up to 4K memory Options: LP, CT

INSTALLATIONS

ALPHANUMERIC WITH LIMITED GRAPHICS CRT DISPLAYS

Manufacturer	Computer Communications 5933 W. Slauson Ave. Culver City, CA 90230 (213) 390-7777	Esterline Electronics 3501 Harbor Blvd. Costa Mesa, CA 92626 (714) 540-1234	Delta Data Systems Woodhaven Ind. Pk. Cornwells Hts, PA 19020 (215) 639-9400
Model	CC-30	6517	Delta 1

Evaluation Guide Procedure VII-1.A NRC Identification No.

PERFORMANCE DATA

Display			
Size	8x6.5in (20.3x16.5cm)	12in (30.5cm) diag.	12 to 23in (30.5 to 58.4cm) diag.
# Char.	960	Information not available	960
Char./Line	Information not available	80	40
# Lines	24	24	24
Char. Set	ASCII	96 ASCII	64/96 ASCII
Char. Form	5x7 dot	5x7 dot	5x7 dot
Data Entry			
Insert/Delete	Information not available	Char. & line	Char & line (opt.)
Tab	Horz. (opt.)	Horz.	Horz. (opt.)
Formatting	Optional	Information not available	Optional
Page Roll	Information not available	Information not available	Optional
Split Screen	Standard	Information not available	Optional
Other	Line erase (opt.)	Black char. on white or white char on black, char. overwrite, blinking	Blinking (opt.)
Graphics Capability	105x85 dot	11,520 element resolution 72 (V) x 160 (H)	128x64 dot
Communications			
Interface	RS232B, parallel computer	RS232C, current loop selectable	RS232B, current loop parallel computer
Data Rate	Up to 9,600bps	110 to 9,600bps selectable	15,000cps
Mode	Half duplex	Half & full duplex	Half & full duplex
Compatability	Information not available	Information not available	TTY 33/35, IBM 2260/65
Other	Mux for 32 display I/O connection	—	—

PHYSICAL DATA

Environment Characteristics	Information not obtained	32 to 120F (0 to 50C) 0 to 95 percent RH	Information not obtained
Weight	Information not obtained	53lb (23.85kg)	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	110V, 110/60Hz	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Options: LP, PT	—	Interfaces for XDS, DEC, IBM computers Options: LP, CT

INSTALLATIONS

ALPHANUMERIC WITH LIMITED GRAPHICS CRT DISPLAYS

Manufacturer	Four-Phase Systems 10420 No. Tantau Ave. Cupertino, CA 95014 (408) 255-0990	GTE/Information Serv. 5300 E. LaPalma Anaheim, CA 92807	Incoterm Corporation 6 Strathmore Rd. Natick, MA 01760 (617) 655-6100
Model	System IV-70	IS/7800	SPD 10/20
Evaluation Guide Procedure VII-1.A		NRC Identification No.	

PERFORMANCE DATA

Display			
Size	7x9in (17.8x22.9cm)	6x9in (15.2x22.9cm)	9x7.5in (22.9x19cm)
# Char.	1,152	128 (incl. lower case)	1,920
Char./Line	48/81	80	64
# Lines	24/12	24	30
Char. Set	120 ASCII: EBCDIC	Information not available	64 EBCDIC
Char. Form	8x10 dot	Dot	7x10 dot
Data Entry			
Insert/Delete	Char. & line (std.)	Char.	Char. & line (std.)
Tab	Horz. & vert. (std.)	Horizontal	Horz. & vert. (std.)
Formatting	Standard	Information not available	Standard
Page Roll	Standard	Information not available	Standard
Split Screen	Standard	Standard	Standard
Other	Blinking, erase to end of line & screen scrolling, paging	Security keylock, blink, underline, wide chars.	—
Graphics Capability	Special char. for construction of diagrams & graphs	Bar charts, form rule	126x120 dot
Communications			
Interface	RS232B, parallel comp.	RS232C	RS232B
Data Rate	Up to 9,600bps	9,600bps async	50 to 9,600bps
Mode	Half & full duplex	Half duplex	Half & full duplex, Echoplex
Compatability	Information not available	Information not available	Information not available
Other	—	—	—

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Options: LP, MT, DD	Programmable by mfg.	Options: LP, PT, CT, MT

INSTALLATIONS

ALPHANUMERIC WITH LIMITED GRAPHICS CRT DISPLAYS

Manufacturer	ITT/Data Equipment & Systems Div. E. Union Ave. E. Rutherford, NJ 07073 (201) 935-3900	Ontel Corporation 3 Fairchild Crt. Plainview, NY 11803	Philco-Ford 1002 Gemini Ave. Houston, TX 77058 (713) 488-1270
Model	3100D Graphascope	O.P.-1	D-33
Evaluation Guide Procedure VII-1.A	NRC Identification No.		

PERFORMANCE DATA

Display			
Size	5.5x8in (14x20.3cm)	7.5inx10.5in (19x26.7cm)	Information not available
# Char.	1,360	Information not available	3,456 see notes
Char./Line	80	80	72
# Lines	17	6/20/24	48
Char. Set	65 ASCII	128 (incl. lower case)	64 ASCII see notes
Char. Form	5x7 dot	5x10 dot	5x7 dot see notes
Data Entry			
Insert/Delete	Char. & line (std.)	Char. & line	Char. & line (std.)
Tab	Horizontal (opt.)	Horz. & vert	Horizontal (opt.)
Formatting	Optional	Information not available	Information not available
Page Roll	Information not available	Information not available	Optional
Split Screen	Information not available	Standard	Information not available
Other	—	Stand-alone operation, blinking, reverse char., underline	—
Graphics Capability	Displays up to 16 X-Y functions	Plotting, cross hatch	384x576 dot
Communications			
Interface	RS232B parallel computer	RS232C loop, mil std.	Information not available
Data Rate	1,200 to 20,000bps	50,000bps sync/38,400cps	—
Mode	Half duplex	Half & full duplex	Half duplex
Compatability	Information not available	Information not available	Information not available
Other	—	—	—

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Option: LP	Programmable by user, mfg. or CPU Options: Built-in modem	Seven color display

INSTALLATIONS

ALPHANUMERIC WITH LIMITED GRAPHICS CRT DISPLAYS

Manufacturer	Photophysics 1601 Stierlin Rd. Mountain View, CA 94040 (415) 696-9500	Photophysics 1601 Stierlin Rd. Mountain View, CA 94040 (415) 696-9500	Photophysics 1601 Stierlin Rd. Mountain View, CA 94040 (415) 696-9500
Model	Series 45 Models 20 and 40	Series 45 Models 24 and 44	Series 45 Models 60 and 80

Evaluation Guide Procedure VII-1.A NRC Identification No.

PERFORMANCE DATA

Display			
Size	7.75x6.5in (19.7x16.5cm)	7.75x6.5in (19.7x16.5cm)	7.75x6.5in (19.7x16.5cm)
# Char.	1,000	960	1,000
Char./Line	40	80	40
# Lines	25	12	25
Char. Set	96 ASCII	96 ASCII	96 ASCII
Char. Form	5x7 dot	5x7 dot	5x7 dot
Data Entry			
Insert/Delete	Char. & line (std.)	Char. (std.) line (opt.)	Char. & line (std.)
Tab	Horz. & vert (std.)	Horz. & vert (std.)	Horz. & vert (std.)
Formatting	Standard	Standard	Standard
Page Roll	Standard	Standard	Standard
Split Screen	Standard	Standard	Standard
Other	Recall last line deleted, repeat char. (std.)	Repeat char. (std.)	Repeat char. (std.)
Graphics Capability	Vert. & horz. line, vert./horz. line intersect	Vert. & horz. line, vert./horz. line intersect	Vert. & horz. line, vert./horz. line intersect
Communications			
Interface	RS232B	RS232B	RS232B
Data Rate	110 to 2,400bps	110 to 2,400bps	1,200 to 2,400bps
Mode	Half duplex see notes	Half duplex see notes	Half duplex
Compatability	Information not available	Information not available	Information not available
Other	—	—	—

PHYSICAL DATA

Environment			
Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Half & full duplex on Model 20 Options: LP, PT, CT	Half & full duplex on Model 24 Options: LP, PT, CT	Options: LP, PT, CT

INSTALLATIONS

ALPHANUMERIC WITH LIMITED GRAPHICS CRT DISPLAYS

Manufacturer	Photophysics 1601 Stierlin Rd. Mountain View, CA 94040 (415) 696-9500	Sugarman Laboratories 295 Northern Blvd. Great Neck, NY 11021 (516) 466-0800	Tektronix, Inc. Info. Display Div. Box 500 Beaverton, OR 97077 (503) 644-0161
Model	Series 45 Models 64 and 84	Series 4000	4023

Evaluation Guide Procedure VII-1.A NRC Identification No.

PERFORMANCE DATA

Display			
Size	7.75x6.5in (19.6x16.5cm)	10x7in (25.4x17.8cm)	12in (30.5cm)
# Char.	960	1,600	Information not available
Char./Line	80	80	80
# Lines	12	20	24
Char. Set	96 ASCII	144 ASCII: EBCDIC	128 ASCII, u & l case
Char. Form	5x7 dot	5x10 dot	5x7 dot
Data Entry			
Insert/Delete	Char. (std.) line (opt.)	Char. & line (std.)	Char. & line
Tab	Horz. & vert (std.)	Horz. & vert (std.)	Information not available
Formatting	Standard	Standard	Information not available
Page Roll	Standard	Standard	Information not available
Split Screen	Standard	Standard	Information not available
Other	Repeat Char. (std.)	Blinking (std.)	—
Graphics Capability	Vert. & horz. line, vert./horz. line intersect	160x80dot & line	Ruling char. set
Communications			
Interface	RS232B	RS232B, parallel computer	RS232C
Data Rate	110 to 2,400bps	110 to 9,600bps	110 to 9,600bps
Mode	Half duplex	Half & full duplex, Echoplex	Full duplex
Compatability	Information not available	Information not available	Information not available
Other	—	—	—

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	46lb (20.7kg)
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	115/230V ac, 50 to 400Hz, 220W

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Options: LP, PT, CT	1K to 4K controller Options: LP, CT	Hard copy unit Tektronix 4632

INSTALLATIONS

ALPHANUMERIC WITH LIMITED GRAPHICS CRT DISPLAYS

Manufacturer	Texas Scientific 8120 Westglen Drive Houston, TX 77042 (713) 785-7731	VMP Ind., Inc. 216 No. Fehr Way Bay Shore, NY 11706	Zentac Corp. 2390 Walsh Ave. Santa Clara, CA 95050
Model	Entelekon 80	TR-100	9002 and 9003
Evaluation Guide Procedure VII-1.A		NRC Identification No.	

PERFORMANCE DATA

Display			
Size	Information not available	Information not available	10x7.5in (25.4x19cm)
# Char.	1,920	Information not available	Information not available
Char./Line	64/80	80	80
# Lines	6/12/16/24	20/24	24
Char. Set	66 ASCII	128 (incl. lower case)	Information not available
Char. form	5x7	5x7/5x9 Dot	7x9 Dot
Data Entry			
Insert/Delete	Char. & line (opt.)	Char. & line	Char. & line
Tab	Horz. & vert. (opt.)	Horz. & vert.	Horizontal
Formatting	Optional	Information not available	Information not available
Page Roll	Optional	Information not available	Information not available
Split Screen	Optional	Standard	Standard
Other	—	Stand-alone operation, blink	Stand-alone operation, blink
Graphics Capability	8x10 matrix for graphics	Forms rules	Plotting; shade, X-hatch, rule
Communications			
Interface	RS232B see notes	RS232C Loop, parallel	RS232C, parallel
Data Rate	4,600bps — 500,000cps	5,600bps async./ 2,400bps	20,000bps sync./ 9,600bps
Mode	Half & full duplex	Half & full duplex	Half & full duplex
Compatability	Information not available	Information not available	Information not available
Other	—	—	—

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

	COST DATA		
Price	Information not obtained	Information not obtained	Information not obtained
	NOTES		
	Current loop, parallel computer, modem Options: LP, PT, CT, MT	Programmable by user, mfg. or CPU	Programmable by user, mfg. or CPU
	INSTALLATIONS		

CRT GRAPHIC DISPLAYS

CRT graphic displays form one category of general purpose cathode ray tube (CRT) displays. In some respects these CRT displays are similar to conventional television receivers. In some displays a medium-short-persistence phosphor (50 microseconds to 100 milliseconds) is used in the CRT, the same type of phosphor employed in conventional monochromatic TV receivers. Other displays use the same CRT that is used in conventional color TV sets, while still other displays employ high resolution (1000 line) color or monochromatic CRTs of the type used in TV studio monitors.

A great variety of CRT displays, meeting many different requirements, is readily available. Their use in physical security systems is outlined in Volume VIII, Section 1 (Alarm Signalling Systems). CRT displays may interface with a computer or a similar display. The degree to which the displays meet requirements is determined by their intrinsic operational capabilities and the number and type of peripheral devices that support them or are supported by them. Such peripherals may include parallel displays, hard-copy output devices such as printers and graphic recorders, and additional memory in the form of magnetic tape cassette record/playback devices.

The CRT display is comprised of five principal elements: The CRT with its associated display/deflection electronics; character-generating or display-forming circuitry; display memory; display control device(s); and circuitry for interfacing the display to external equipments. These elements may be either physically integrated into a single console/cabinet or interconnected by appropriate cables.

CRT graphic displays use one of three deflection methods. Some use the video or raster scan deflection method (the one used in con-

ventional TV sets), in which an electron beam sweeps continuously from left to right through a series of 525 horizontal lines (1000 lines if high resolution CRTs are used) over the entire screen area. All odd-numbered lines are scanned in one pass (one-sixtieth of a second), then the even-numbered lines are scanned in the next one-sixtieth of a second. This "interlace" of the scan lines completes the entire image or frame in one-thirtieth of a second. In a video or raster scan device the displayed characters are composed of dot patterns, which are formed with the electron beam "on" or unblanked for each dot. The lines/arcs that portray the graphics are also formed by dot patterns. However, some displays that use the raster deflection method use a mix of dots and lines to form the graphic symbols. In this case, the horizontal structure of the graphics are lines and the vertical structure is formed by dots. Two other basic types of deflection methods are commonly employed in CRT graphic displays. In the sawtooth scan method, the beam is deflected to an addressed position, then guided through a series of short horizontal and vertical strokes to define the characters or graphic elements (lines) which may be comprised of dot or stroke patterns or a combination of the two whose width, height, spacing and length can be separately adjusted manually or by computer control. In the programmed or directed beam scan method, the beam is deflected to the appropriate positions on the screen under the direction of control logic. Once positioned, the character or graphics is fashioned as in the sawtooth scan method by a series of dots or strokes.

The character or vector generating circuits accept binary coded characters from the local keyboard or communications interface and convert them into deflection signals. Basic character generators produce 64 upper-case alphanumeric characters including a few special symbols. Extended generators can form more characters/vectors as well as many combinations of special symbols, upper and lower case alphanumerics and line drawing graphics.

The memory in CRT displays provides storage for refreshing the display image and supports the display controls and external and local interfaces. The refresh memory is used to sustain the character image on the face of the CRT at a refresh rate sufficient to prevent "flicker". The memory is usually large enough to store at least one "page" or screen full of data. If additional refresh storage is provided, the CRT display has a "paging" capability that permits the user to index lines that have rolled off the screen. The memory provides sufficient "buffering" to match the operational communications interface, and supports local cursor indexing, character/line insert/delete, tab, and format controls.

The CRT display control devices usually consist of a keyboard augmented with special function keys. The function keys provide cursor control and edit controls such as erase and insert/delete character/line. Some CRT displays for special applications may have limited or augmented key input capabilities. For example, some displays may only have a numeric key pad, or may have a numeric key pad in addition to a complete keyboard. Other display controls, similar to those of conventional TV sets, are display brightness and contrast. These are separate from the keyboard but are generally accessible to the operator.

The interfacing circuitry couples the CRT display to external devices. These interfaces may include a teletype-compatible current loop, or may conform to the electrical and logic specifications of the Electronic Industry Association (EIA) RS-232 standards, or may provide Diode Transistor Logic/Transistor-Transistor Logic (DTL/TTL) signal levels. Some displays have built-in data sets or modems (modulator-demodulator) which not only convert the transmitted binary character code voltages into audible tones or frequencies that are acceptable to the communications lines but also convert the received tones or frequencies to the binary signal needed by the display electronics. Many CRT displays provide switch-selectable input/output

characteristics to permit a variety of data rate, electrical, and logic interfaces. Data transmission and reception between the display and interconnected devices can occur simultaneously (full-duplex mode) or alternatively in one direction at a time (half-duplex). Other transmission modes are echoplex (keyboard-to-interconnected device simultaneously with interconnected device-to-display) and simplex (display-to-display only).

The performance parameters of CRT displays generally fall into one of two major interrelated areas: those that affect the "legibility" of the presented information, and those that are related to the particular operational mode(s) in which the display is employed.

Legibility performance depends on many factors, including the contrast between the displayed image and the background; screen luminance and ambient illuminance; display screen characteristics such as screen blemishes, ion and/or pattern burns, and screen noise which creates elemental variations in radiant emission across the screen; spot and character/symbol size and spacing; character/symbol flicker; and jitter of the displayed characters/symbols. Measures of overall legibility are determined by statistical methods. However, if the above aspects are satisfactory, and the operational mode performance needs are met, the display is generally suitable.

The operational performance capability also depends on the capabilities of the basic elements. Certain factors, however, have more impact than others in determining operational capability. Some of these are the size of the screen or viewing area, the number and types of characters/symbols displayed; interface characteristics such as data rates, signal levels and types; information transfer capabilities; block, page, line or character transfer rules and procedures. In addition, the physical operational environment in regards to ambient lighting and the position of the display (viewing angle/

distance) with respect to the operator impact on the overall performance of the CRT displays for their intended uses.

The degree of maintenance capability required depends on the complexity of the CRT display. The simpler displays (such as the KSR and RO teletype equivalent) depend on scheduled maintenance activities. Faults or degradation in performance occurring between scheduled periods are usually detected visually, backed up by visual "trouble" light indications. The more sophisticated displays that are interconnected to a computer may have periodic offline/online diagnostic checks made automatically to indicate faults and confirm satisfactory operation. These diagnostics range in capability from simple "go-no-go" tests up to canned/simulated operational tests which exercise the entire display.

Inasmuch as the general purpose CRT displays are manufactured for a wide range of applications, tamper switches are not incorporated therein. However, the displays have incorporated provisions for reducing effects of RFI and EMI because they are normally collocated with other equipments, e.g., computers, memory devices.

The CRT graphic displays are the most versatile of the general purpose CRT displays. Their versatility is due to use of the programmed or directed beam deflection method, extended character generators, substantial augmentation of the display memory (both integral with the display and in the form of interconnected memory devices), substantial increases in the number of devices used to control the display (light pen, joystick, track ball) and a keyboard with added numeric pads and function keys. Furthermore, the CRT graphic displays can be interconnected with a large variety of devices which have more expanded capabilities and functions.

The graphic displays can generally display more information than the other displays by generating a spot size that is on the order of one-half the radius of that generated in the other displays and

by controlling the deflection/positioning of the beam to a precision approaching 0.1% of full screen deflection. When more information is to be displayed, the local refresh memory must be expanded. The "flicker" on the face of the tube depends on both the amount of total information displayed and the memory access/vector computing time. Therefore, the refresh rate is usually a variable and longer-persistance phosphors are employed. In fact, some CRT graphic displays incorporate a storage type of CRT whose phosphor can store an image for long periods of time, reducing the need to use memory to refresh the display. Most storage tubes use a focused high-energy electron beam to form the displayed image, and a lower-energy diffuse beam that floods the entire screen area to refresh the display. This dual-beam mode of generating and refreshing the display usually reduces the contrast between the image and the background, lessening legibility. In addition the image "write" time is longer than that of the standard type of CRT, due in part to the need for a high-energy "write" electron beam.

The display should be positioned so that the nominal viewing distance is 16 inches (41 cm) for a display screen size of 13 x 14 in (33 x 35.6 cm). If the viewing distance is much greater than 16 inches (41 cm), displays should be selected that have larger character/symbol sizes, greater brightness ranges, and larger character, word and line spacing.

The cost of providing the capabilities and versatility of CRT graphic displays are substantial. The purchase prices range from about $6,500 up to over $150,000. Information on lease costs for these devices is not available.

The data sheets for this category show that there are numerous options available for interfacing with appended devices. These options, as abbreviated, are: LP - Line/Page Printer; PT - Paper Tape; CT - Cassette Transport; MT - Magnetic Tape Transport; DD - Disk Drive; PC - Printer/Copier; and PLT - Plotter.

GRAPHICS CRT DISPLAYS

Manufacturer	Adage, Inc. 1079 Commonwealth Ave. Boston, MA 02215 (617) 783-1100	Adage, Inc. 1079 Commonwealth Ave. Boston, MA 02215 (617) 783-1100	Adage, Inc. 1079 Commonwealth Ave. Boston, MA 02215 (617) 783-1100
Model	ARDS 100B	AGT 110	AGT 130
Evaluation Guide Procedure VII-1.A		NRC Identification No.	

PERFORMANCE DATA

Display			
Size	6.5x8.5in (16.5x21.6cm)	13x14in (33x35.6cm)	13x14in (33x35.6cm)
# Char.	4,160	3,840	3,840
Char./Line	80 or 40	96	96
# Lines	52 or 26	40	40
Char. Set	96; 192 (opt)	64/96 ASCII	64/96 ASCII
Char. Form	7x9 Dot	Stroke	Stroke
Refresh Rate	Storage tube display	60 (variable)	60 (variable)
Data Entry			
Insert/Delete	Line delete (opt)	Char & line (std)	Char & line (std)
Tab	Horz (opt)	Horz & vert (std)	Horz & vert (std)
Formatting	Information not available	Standard	Standard
Page Roll	Information not available	Standard	Standard
Split Screen	Information not available	Standard	Standard
Other	See notes	—	—
Graphics			
Visible Raster	1,169x1,501	13x14in (33x35.6cm)	13x14in (33x35.6cm)
Max. Comp.	1,023 raster unit	10in (25.4cm)	10in
Posit. Modes	Absolute	Absolute	Absolute
Vector Modes	Information not available	Absolute	Absolute
View Opt.	Refresh mode	Shift, 2D zoom	Shift rotate,
	Editing & Dynamics	Standard	2d & 3D zoom (std)
Pointers	All types	All types	All types
Other	HW dashed lines	—	See notes
Communications			
Interface	Information not available	RS232B, Parallel Comp	RS232B, Parallel Comp
Data Rate	50,000bps	Up to 1 Mbps	Up to 1 Mbps
Mode	H & F duplex, Echoplex	Half & full duplex	Half & full duplex
Other	TTY, IBM 360 compat	301B; 203	301B; 203
Internal Processor	Information not available	Adage DPR-4; 8Kx30; 32K expandable	Adage DPR-4; 8Kx30; 32K expandable

PHYSICAL DATA

Environment			
Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Refresh mode editing & dynamics Keyboard Cursor Control (opt) Repeat Key (opt) Option: PC	Options: PC, LP, PT, MT DD	HW array transformation for: Obj scale; Picture scale; 3D trans & rotation; Depth cue.; Intensity scale & disp. Options: PC, LP, PT, MT DD

INSTALLATIONS

GRAPHICS CRT DISPLAYS

Manufacturer	Adage, Inc. 1079 Commonwealth Ave. Boston, MA 02215 (617) 783-1100	Computek 143 Albany St. Cambridge, MA 02139 (617) 864-5140	Conographic Corp. 6 Gill St. Woburn, MA 01801 (617) 935-7300
Model	AGT 150	400 Display System	Conograph/10
Evaluation Guide Procedure VII-1.A		NRC Identification No.	

PERFORMANCE DATA

Display			
Size	13x14in (33x35.6cm)	8.25x6.4in (21x16.4cm)	8.3x6.5in (21x16.5cm)
# Char.	3,840	3,400	Information not available
Char./Line	96	85	to 341
# Lines	40	40	to 158
Char. Set	64/96 ASCII	96 ASCII	96 ASCII
Char. Form	Stroke	Stroke	Stroke
Refresh Rate	60 (variable)	Storage tube display	40Hz storage tube display
Data Entry			
Insert/Delete	Char & line (std)	Information not available	Information not available
Tab	Horz & vert (std)	Information not available	Horz & vert (opt)
Formatting	Standard	Information not available	Information not available
Page Roll	Standard	Information not available	Information not available
Split Screen	Standard	Information not available	Information not available
Other	—	Keyboard cursor control	—
Graphics			
Visible Raster	13x14in (33x35.6cm)	1,024x800	2,048x1,558
Max. Comp.	10in (25.4cm)	Information not available	2,048 raster units
Posit. Modes	Absolute	Information not available	Absolute & relative
Vector Modes	Absolute	Absolute & relative	Absolute & relative
View Opt.	Shift, rotate, 2D & 3D Zoom (std)	Information not available	Shift, rotation (std) Scaling 1 to 15X
Pointers	All types	Light pen, tablet Joystick	Tablet, mouse Joystick
Other	See notes	—	See notes
Communications			
Interface	RS232B, Parallel comp.	RS232	RS232C, Parallel comp.
Data Rate	Up to 1Mbps	Up to 9,600bps	Information not available
Mode	Half & full duplex	Half & full duplex	Half & full duplex
Other	301B; 203	—	TTY compatible
Internal Processor	Adage DPR-4; 8Kx30; 32K expandable	Information not available	Conographic 16; 4Kx16

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Options: PC, LP, PT, MT DD

HW point, vector curve, figure, char. & symbol generators
Options: PC

INSTALLATIONS

GRAPHICS CRT DISPLAYS

Manufacturer	Control Data Corp. 8100 34th Ave. So. Minneapolis, MN 55420 (612) 888-5555	Control Data Corp. 8100 34th Ave. So. Minneapolis, MN 55420 (612) 888-5555	Control Data Corp. 8100 34th Ave. So. Minneapolis, MN 55420 (612) 888-5555
Model	240; 9820 and 9821	250	270

Evaluation Guide Procedure VII-1.A NRC Identification No.

PERFORMANCE DATA

Display			
Size	12x12in (30.5x30.5cm)	11.3x11.3in (28.7x28.7cm)	20in (50.8cm) round
# Char.	12,288	8,704	14,892
Char./Line	64/86	136	146
# Lines	43/64	64	102
Char. Set	64 BCD	128 BCD	Software
Char. Form	7x9 stroke	7x9 stroke	Stroke
Refresh Rate	50 (Programmable)	50	50
Data Entry			
Insert/Delete	Char & line (std)	Char & line (std)	Char & line (std)
Tab	Vert (std)	Horz & vert (std)	Horz & vert (std)
Formatting	Standard	Standard	Standard
Page Roll	Optional	Optional	Optional
Split Screen	Optional	Optional	Optional
Other	—	—	—
Graphics			
Visible Raster	12x12in (30.5x30.5cm)	11.3x11.3in (28.7x28.7cm)	20in (50.8cm) round
Max. Comp.	1,024 raster unit	1,024 raster unit	7 raster units
Posit. Modes	Absolute & relative	Absolute & relative	Absolute & relative
Vector Modes	Absolute & relative	Absolute & relative	Absolute & relative
View Opt.	Shift (std) Rotate (opt)	Shift (std); rotate 2D & 3D zoom (opt)	Information not available
Pointers	Light pen	Light pen	Light pen, tablet
Other	—	—	—
Communications			
Interface	RS232B, Parallel comp	Parallel comp	Parallel comp
Data Rate	Information not available	Information not available	Information not available
Mode	Full duplex	Information not available	Information not available
Other	—	—	—
Internal Processor	201 A/B; 301B; CDC 241/242/243; 4Kx12; 12K expandable	CDC 3398; 4Kx24; 8K expandable	CDC 3344/1744; 4Kx16; 16K expandable

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

	Options: PC, LP, PT, TM DD	Options: 16/35mm microfilmer PC

INSTALLATIONS

GRAPHICS CRT DISPLAYS

Manufacturer	Data Disc 1275 California Ave. Palo Alto, CA 94304 (415) 326-7602	Data Disc 1275 California Ave. Palo Alto, CA 94304 (415) 326-7602	Digital Equipment Corp. 146 Main St. Maynard, MA 01754 (617) 897-5111
Model	6500	6600	Graphic 15
Evaluation Guide Procedure VII-1.A	NRC Identification No.		

PERFORMANCE DATA

Display			
Size	TV monitor	TV monitor	9.5x12in (24.1x30.5cm)
# Char.	4,335	3,200	3,000
Char./Line	85	80	72
# Lines	51	40	55
Char. Set	64 ASCII	96 ASCII	ASCII
Char. Form	5x7 dot	7x10 dot	Stroke
Refresh Rate	30	30	30
Data Entry			
Insert/Delete	Information not available	Information not available	Information not available
Tab	Information not available	Information not available	Information not available
Formatting	Information not available	Information not available	Information not available
Page Roll	Information not available	Information not available	Information not available
Split Screen	Optional	Optional	Information not available
Other	Cursor is option	Cursor is option	—
Graphics			
Visible Raster	512 X 512	640 X 480	1,024 X 1,024
Max. Comp.	Information not available	Information not available	1,024 raster units
Posit. Modes	Information not available	Information not available	Absolute
Vector Modes	Information not available	Information not available	Relative
View Opt.	Information not available	Information not available	Shift, 2D zoom (std)
Pointers	Light pen, trackball	Light pen, trackball	Light pen, tablet
Other	See notes	See notes	See notes
Communications			
Interface	Parallel computer	Parallel computer	RS232B, Current loop
Data Rate	Information not available	Information not available	Information not available
Mode	Information not available	Information not available	Information not available
Other	—	—	—
Internal Processor	Information not available	Information not available	DEC PDP-15; 4Kx18; 128K expandable

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Color, grey scale, special characters (opt) Option: PC	Color, grey scale, special characters (opt) Option: PC	Scissoring, 16 scales Software rotate & 3D Options: PC, LP, PT, MT, DD

INSTALLATIONS

GRAPHICS CRT DISPLAYS

Manufacturer	Evans and Sutherland Computer Corp. 3 Research Rd. Salt Lake City, UT 84112 (801) 322-5847	Hazeltine Corporation Greenlawn, NY 11740 (516) 549-8800	Hazeltine Corporation Greenlawn, NY 11740 (516) 549-8800
Model	LDS-1	DDG-1	DDG-3
Evaluation Guide Procedure VII-1.A	NRC Identification No.		

PERFORMANCE DATA

Display			
Size	Information not available	TV monitor	TV monitor
# Char.	2,000	7,738	7,738
Char./Line	50	146	146
# Lines	40	53	53
Char. Set	256	128	128
Char. Form	Stroke	Up to 32x32 dot	Up to 16x16 dot
Refresh Rate	30	30	30
Data Entry			
Insert/Delete	Information not available	Char (std)	Char & line (std)
Tab	Information not available	Information not available	Horz & vert (std)
Formatting	Information not available	Information not available	Standard
Page Roll	Information not available	Information not available	Standard
Split Screen	Information not available	Information not available	Standard
Other	—	See notes	—
Graphics			
Visible Raster	4,096x4,096	1,024x480	1,024x480
Max. Comp.	262 raster units	1,024 raster unit	1,024 raster unit
Posit. Modes	Absolute & relative	Absolute	Absolute
Vector Modes	Absolute & relative	Absolute	Absolute & relative
View Opt.	Shift rotate, 2D & 3D zoom (opt)	Shift (std)	Information not available
Pointers	Tablet	Information not available	Light pen
Other	See notes	See notes	See notes
Communications			
Interface	Parallel Computer	Parallel Computer	Parallel Computer
Data Rate	Information not available	9Mbps	9Mbps
Mode	Information not available	Information not available	Information not available
Other	—	—	IBM 2701
Internal Processor	See notes	Hazeltine; 20Kx32	Hazeltine; 32Kx16

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Clipping divider, color & stereo display, char Controller uses host computer memory	Random Selec. Update Erase of Char & Lines Option: PC	20 displays/system, 2 interactive Option: PC

INSTALLATIONS

GRAPHICS CRT DISPLAYS

Manufacturer	Hazeltine Corporation Greenlawn, NY 11740 (516) 549-8800	Honeywell Info. Systems 200 Smith St. Waltham, MA 02154 (617) 891-8400	IBM Corporate Headquarters Armonk, NY 10504 (914) 765-1900
Model	DDG-5	316/516-7420	2250

Evaluation Guide Procedure VII-1.A NRC Identification No.

PERFORMANCE DATA

Display			
Size	TV monitor	12x12in (30.5x30.5cm)	12x12in (30.5x30.5cm)
# Char.	4,176	Information not available	3,848
Char./Line	87	Information not available	74
# Lines	48	Information not available	52
Char. Set	128	64 ASCII	63
Char. Form	Up to 14x20 dot	Stroke	Stroke
Refresh Rate	30	40	30
Data Entry			
Insert/Delete	Information not available	Information not available	Information not available
Tab	Information not available	Information not available	Information not available
Formatting	Information not available	Information not available	Information not available
Page Roll	Information not available	Information not available	Information not available
Split Screen	Information not available	Information not available	Information not available
Other	—	—	—
Graphics			
Visible Raster	612x439	1,024x1,024	1,024x1,024
Max. Comp.	945 raster units	Information not available	Information not available
Posit. Modes	Absolute	Absolute & relative	Absolute & relative
Vector Modes	Absolute	Absolute & relative	Absolute & relative
View Opt.	Information not available	Information not available	Information not available
Pointers	Information not available	Light pen	Light pen
Other	See notes 1, 2	See notes	—
Communications			
Interface	Parallel computer	Parallel computer	Parallel computer
Data Rate	3.2Mbps	Information not available	Information not available
Mode	Information not available	Information not available	Information not available
Other	IBM 2701	Honeywell Series 16	IBM 1130
Internal Processor	Hazeltine; 16Kx48	Information not available	IBM: 2Kx16; 4K expandable

PHYSICAL DATA

Environment			
Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

1. 8 displays/system 2. 1975 stored backgrounds for call up Option: DD	HW char. plotting, circle, line generators (opt.) Options: LP, LPT, PT, MT, DD	Options: PC, LP, MT, DD

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GRAPHICS CRT DISPLAYS

Manufacturer	IMLAC Corporation 296 Newton St. Waltham, MA 02154 (617) 891-1600	Information Displays, Inc. 333 No. Bedford Rd. Mt. Kisco, NY 10549 (914) 241-1000	Information Displays, Inc. 333 No. Bedford Rd. Mt. Kisco, NY 10549 (914) 241-1000
Model	PDS-1	IDIgraf	IDIIOM

Evaluation Guide Procedure VII-1.A NRC Identification No.

PERFORMANCE DATA

Display			
Size	8x10in (20.3x25.4cm)	10x10in (25.4x25.4cm)	13x13in (33x33cm)
# Char.	3,200	2,048	2,048
Char./Line	80; 128 (opt.)	73	128
# Lines	40	51	85
Char. Set	96 ASCII; EBCDIC	128 ASCII	128 ASCII, See note 1
Char. Form	7x9 stroke	16x16 stroke	7x9 stroke
Refresh Rate	40	30	30/20
Data Entry			
Insert/Delete	Char. & line (std.)	Char. & line (opt.)	Char & line (std.)
Tab	Horz. & vert. (std.)	Horz. & vert (opt.)	Horz. & vert. (std.)
Formatting	Standard	Optional	Standard
Page Roll	Standard	Optional	Standard
Split Screen	Standard	Optional	Standard
Other	—	—	—
Graphics			
Visible Raster	1,024x1,024	1,024x1,024	1,024x1,024
Max. Comp.	1,024 raster units	1,024 raster units	1,024 raster units
Posit. Modes	Absolute & relative	Absolute & relative	Absolute & relative
Vector Modes	Relative	Absolute & relative	Absolute & relative
View Opt.	Shift (std.)	Shift, rotate (opt.)	Shift, rotate, 2D & 3D zoom (std.)
Pointers	Light pen, tablet, mouse	Light pen, tablet	Light pen, trackball, joystick
Other	See notes	—	See note 2
Communications			
Interface	RS232B, parallel comp.	RS232B, Current loop	Parallel computer
Data Rate	1.6Mbps	5Kbps	50Kbps
Mode	H&F, Echoplex	Full duplex	Full duplex
Other	TTY & IBM compatible	—	—
Internal Processor	IMLAC; 4Kx16; 32K expandable	ID; 1Kx10; 8K expandable	Varian 620/f; 4Kx16; 32K expandable

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Software controlled graphics (std.) Options: PC, LP, PT, MT, DD	Up to 4 displays/ controller	1. Plus 64 programmable 2. HW char., circle generators Options: PC, LP, PT, MT, DD

INSTALLATIONS

GRAPHICS CRT DISPLAYS

Manufacturer	Lundy Electronics & Systems (Comp. Graphics Division) 28 Park Place Paramus, NJ 07652 (201) 262-5400	Marconi-Elliott Comp. Systems Elstree Way, Boreham wood, Hertfordshire, UK 01-953-2030	Monitor Displays 401 Commerce Drive Ft. Wash., PA 19034 (215) 646-8100
Model	System 32	928	5205

Evaluation Guide Procedure VII-1.A NRC Identification No.

PERFORMANCE DATA

Display			
Size	20in (50.8cm) round	17in (43.2cm) diag.	TV monitor
# Char.	6,000	8,192	3,456
Char./Line	160	Information not available	72
# Lines	80	Information not available	48
Char. Set	96/192 ASCII; EBCDIC	88	96 ASCII
Char. Form	Stroke	Stroke	5x5 Dot
Refresh Rate	10 to 100	12Hz	50
Data Entry			
Insert/Delete	Information not available	Information not available	Char. & line (std.)
Tab	Information not available	Information not available	Horz. & vert. (std.)
Formatting	Information not available	Information not available	Standard
Page Roll	Information not available	Information not available	Standard
Split Screen	Information not available	Information not available	Information not available
Other	—	—	See notes
Graphics			
Visible Raster	1,430x1,420	1,024x1,024	576x288
Max. Comp.	2,047 raster units	Information not available	Information not available
Posit. Modes	Absolute & relative	Information not available	Relative
Vector Modes	Absolute & relative	Information not available	Information not available
View Opt.	Shift & rotate (std.) 3D zoom (opt.)	Shift, rotate 2D & 3D zoom	Information not available
Pointers	Light pen, tablet, trackball, joystick	Light pen	Light pen, trackball, joystick
Other	See notes 1, 2	See notes	See notes
Communications			
Interface	RS232B, Parallel comp.	Information not available	RS232B, Parallel comp.
Data Rate	4,800bps	Information not available	454Kbps
Mode	Information not available	Information not available	Information not available
Other	IBM 2250 compatible	M-E 905	—
Internal Processor	Lundy; 8Kx16; 16K expandable	Information not available	4Kx12 per channel

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

1. HW char. circle, ellipse rectangle, dot/dash generators 2. Stand-alone or multi-display systems Options: LP, PT, MT	HW char. circle, arc generator Options: LP, PT, DD	Seven color display

INSTALLATIONS

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GRAPHICS CRT DISPLAYS

Manufacturer	Monitor Displays 401 Commerce Drive Ft. Wash, PA 19034 (215) 646-8100	Princeton Elect. Prod. P.O. Box 101 No. Brunswick, NJ 08902 (201) 297-4448	Sanders Data Systems Daniel Webster Hwy. Nashua, NH 03060 (603) 885-6660
Model	8100	PEP-801	ADDS/900-960

Evaluation Guide Procedure VII-1.A NRC Identification No.

PERFORMANCE DATA

Display			
Size	12x12in (30.5x30.5cm)	10x14in (25.4x35.6cm)	14x14in (35.6x35.6cm)
# Char.	4,000	4,250/8,000	Information not available
Char./Line	80	85/128	112
# Lines	50	50/64	74
Char. Set	64 ASCII	128 ASCII	128 ASCII
Char. Form	Stroke	7x9 dot	Stroke
Refresh Rate	10 to 60	Storage tube display	60
Data Entry			
Insert/Delete	Char & line (std.)	Char. (std.) line (opt.)	Information not available
Tab	Horz. & vert. (std.)	Information not available	Information not available
Formatting	Standard	Standard	Information not available
Page Roll	Information not available	Standard	Information not available
Split Screen	Information not available	Information not available	Information not available
Other	—	—	—
Graphics			
Visible Raster	1,024x1,024	1,024x1,024	1,024x1,024
Max. Comp.	1,024 raster units	Information not available	Information not available
Posit. Modes	Absolute	Absolute & relative	Absolute & relative
Vector Modes	Relative	Absolute & relative	Absolute & relative
View Opt.	Information not available	2D Zoom (std.)	Shift, rotate (opt.)
Pointers	Light pen	Tablet, joystick	Light pen, trackball, joystick
Other	See notes	—	See notes
Communications			
Interface	Parallel computer	RS232B, Parallel comp.	RS232B
Data Rate	3.2Mbps	2,400bps	Information not available
Mode	Half duplex	H&F duplex, Echoplex	Information not available
Other	—	—	IBM 360
Internal Processor	Varian 620/i; 8Kx16; 32K expandable	Information not available	Varian 620/i; 4Kx16; 32K expandable

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

HW char. circle, arc, dot/dash generators Options: LP, PT, MT,	Options: LP	HW char., vector, conic generators Options: PT

INSTALLATIONS

GRAPHICS CRT DISPLAYS

Manufacturer	Systems Concepts 524 Second St. San Francisco, CA 94107 (415) 433-5400	Systems Concepts 524 Second St. San Francisco, CA 94107 (415) 433-5400	Systems Engineering Labs 6901 W. Sunrise Blvd. Ft. Lauderdale, FL 33313 (305) 587-2900
Model	DELTA-1/SC-2	DELTA-2/SC-2	80-816

Evaluation Guide Procedure VII-1.A NRC Identification No.

PERFORMANCE DATA

Display			
Size	12.5x12.5in (31.7x31.7cm)	10x10in (25.4x25.4cm)	10x10in (25.4x25.4cm)
# Char.	8,192	8,192	2,380
Char./Line	128/85/64/43	128/85/64/43	85
# Lines	64/43/32/22	64/43/32/22	64
Char. Set.	96/128 ASCII	96/128 ASCII	128 ASCII
Char. Form	14x10 stroke	14x10 stroke	5x7 stroke
Refresh Rate	30	30	30/60
Data Entry			
Insert/Delete	Char. & line (opt.)	Char. & line (opt.)	Information not available
Tab	Horz. & vert. (opt.)	Horz. & vert. (opt.)	Information not available
Formatting	Optional	Optional	Information not available
Page Roll	Optional	Optional	Information not available
Split Screen	Optional	Optional	Information not available
Other	—	—	—
Graphics			
Visible Raster	1,024x1,024	512x512	1,024x1,024
Max. Comp.	1,024 raster units	512 raster units	Information not available
Posit. Modes	Absolute & relative	Absolute & relative	Absolute
Vector Modes	Absolute & relative	Absolute & relative	Relative
View Opt.	Shift (opt.)	Shift (opt.)	—
Pointers	Light pen, joystick, Mouse	Light pen, joystick, Mouse	Light pen, trackball
Other	—	—	—
Communications			
Interface	Parallel computer	Parallel computer	Parallel computer
Data Rate	Information not available	Information not available	5Mbps
Mode	Information not available	Information not available	Information not available
Other	—	—	SEL 800
Internal Processor	SC-2; 4Kx18; 65K expandable	SC-2; 4Kx18; 65K expandable	Information not available

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

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COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

	Options: LP, PT, MT, DD	Options: LP, PT, MT, DD

INSTALLATIONS

GRAPHICS CRT DISPLAYS

Manufacturer	Systems Engineering 6901 W. Sunrise Blvd. Ft. Lauderdale, FL 33313 (305) 587-2900	Tektronix, Inc. P.O. Box 500 Beaverton, OR 97005 (503) 644-0161	Univac P.O. Box 500 Blue Bell, PA 19422 (215) 825-2560
Model	80-821	T-4002A	1557 and 1558

Evaluation Guide Procedure VII-1.A NRC Identification No.

PERFORMANCE DATA

Display			
Size	12.3x12.3in (31.2x31.2cm)	8.3x6.5in (21x16.5cm)	12x12in (30.5x30.5cm)
# Char.	2,380	3,315	Information not available
Char./Line	85	85	Information not available
# Lines	64	40	Information not available
Char. Set	126 ASCII	ASCII	64 ASCII
Char. Form	5x7 stroke	7x9 dot	Stroke
Refresh Rate	—	Storage tube display	—
Data Entry			
Insert/Delete	Information not available	Char. & line (std.)	Information not available
Tab	Information not available	Horizontal (std.)	Information not available
Formatting	Information not available	Standard	Information not available
Page Roll	Information not available	Information not available	Information not available
Split Screen	Information not available	Standard	Information not available
Other	—	See note 1	
Graphics			
Visible Raster	1,024x1,024	1,024x1,024	1,024x1,024
Max. Comp.	Information not available	1,024 raster units	1,024 raster units
Posit. Modes	Absolute	Absolute & relative	Absolute & relative
Vector Modes	Absolute	Absolute & relative	Absolute & relative
View Opt.	Information not available	Information not available	Information not available
Pointers	Light pen, trackball	Tablet, mouse	Light pen
Other	—	—	See notes
Communications			
Interface	Parallel computer	RS232B	RS232B
Data Rate	5Mbps	Information not available	Information not available
Mode	Information not available	Information not available	Information not available
Other	SEL 800	See note 2	UNIVAC 1100
Internal Processor	Information not available	Information not available	UNIVAC 1557; 8Kx18; 16K expandable

PHYSICAL DATA

Environment			
Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

1. Refresh scratch pad areas at 40Hz for 85 char.
2. TTY-port interfaces for minicomputer IBM 360 Options: PC

Controller drives 1 to 3 displays

INSTALLATIONS

GRAPHICS CRT DISPLAYS

Manufacturer	Vector General 8399 Topanga Canyon Blvd. Canoga Park, CA 91304 (213) 346-3410	Xerox Data Systems 701 So. Aviation Blvd. El Segundo, CA 90245 (213) 772-4511
Model	Graphics Display	7580
Evaluation Guide Procedure VII-1.A	NRC Identification No.	

PERFORMANCE DATA

Display		
Size	13x14in (33x35.6cm)	10x10in (25.4x25.4cm)
# Char.	7,200	Information not available
Char./Line	120/80/60/32	Information not available
# Lines	60/40/30/16	Information not available
Char. Set	192 ASCII	64 ASCII
Char. Form	3x2 stroke	Stroke
Refresh Rate	30	—
Data Entry		
Insert/Delete	Char. & line (std.)	Information not available
Tab	Horz. & vert. (std.)	Information not available
Formatting	Standard	Information not available
Page Roll	Optional	Information not available
Split Screen	Optional	Information not available
Other	—	—
Graphics		
Visible Raster	4,096x4,096	1,024x1,024
Max. Comp.	4,096 raster units	1,024 raster units
Posit. Modes	Absolute & relative	Information not available
Vector Modes	Absolute & relative	Information not available
View Opt.	Shift, rotate, 2D & 3D zoom (opt.)	
Pointers	Light pen, tablet, mouse	Light pen
Other	See notes	—
Communications		
Interface	Parallel computer	Information not available
Data RAte	Information not available	Information not available
Mode	Information not available	Information not available
Other	—	Sigma 5 & 7
Internal Processor	4Kx16; 128K expandable	Information not available

PHYSICAL DATA

Environment		
Characteristics	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained

NOTES

16 intensity levels
Options: PC, LP, PT, MT, DD

INSTALLATIONS

SERIAL AND RECEIVE-ONLY PRINTERS

Printers are almost universally employed to create visual records of a display of information. Even though a number of types are readily available with wide ranges of capabilities, all printers include four generic elements: print and ink mechanism, paper feed controls, printer operation controls, and interfacing elements. The use of printers in physical security systems is outlined in Volume VIII, Section 1 (Alarm Signalling Systems).

Many printers can interface with a wide range of devices (CRT displays, computers, magnetic tape transports), while others can only interface with a very limited number. Some printers have a keyboard that permits local entry of information and interchange of information with other interconnected devices, while others can only receive and print information derived from other sources. Among the wide choices of interfacing capabilities there is also the opportunity to select different printer information input/output data rates, print speeds, numbers of characters and fonts, numbers of characters per line, type of paper, paper feed, and so on.

Serial and receive only (RO) printers generally have a common set of characteristics that distinguish them from other general purpose printers: they can only receive and print information derived from other sources, they print one character at a time, and they can print at least 80 characters per line. Although these printers present a wide range of printing speeds and information acceptance rates, most serial and RO printers in general use have printing speeds between 10 and 30 characters per second and information acceptance rates between 75 and 150 bits per second. The units capable of the higher rates usually have a one line buffer memory capacity. The devices in this category present a wide range of choices in such

features as number of characters and fonts, type of paper, and paper feed and print mechanisms.

By far the most widely used type of print mechanism is the impact type. However, with technical advances, and with the need to reduce the noise level in operating environments, more non-impact printers of various types are becoming available. Impact printers operate much like a conventional typewriter. An impression is transferred from a type slug on a ball, drum, chain or wheel to the paper. Ink is provided by a ribbon or a roller, or is incorporated in the paper itself. Some printers are equipped with dual color (red and black) ink ribbons to distinquish critical information. Multiple copies may be obtained, as with a typewriter. Another type of impact mechanism uses a solenoid-driven matrix of points instead of a type slug, forming a dot matrix character on the paper. Different sizes of dot matrices are provided with different machines. The 5 x 7 dot matrix is most common, but other matrices offering a higher degree of legibility are available: 7 x 7, 7 x 9, 5 x 9.

There are three varieties of non-impact print mechanisms: electrode, electro-optical and spray. In an electrolytic printer the electrodes form the image by the transfer of metal ions from the positively charged metal electrode to chemically-treated electrosensitive paper. The electrodes charge the surface of the paper, and the latent image formed by the charge attracts a toner which is developed by either heat or solvent to produce the character. In a thermal printer, the electrodes are resistive and are heated by current pulses to form the image on heat-sensitive paper. The second class of mechanisms uses electro-optics to flash an optical image on photosensitive paper, forming the character. The third class is the "video-jet" type that sprays controlled jets or drops of ink onto the page, generating a dot matrix that has very good legibility -- the dots are so close together that the character appears to be composed of straight lines. None of the non-impact-type printers makes copies or prints in two colors.

Ribbons for some impact printers are mounted on spools whose width is equal to the column width; the ribbon travels in the same direction as the paper. Other printers use a narrow (3/4 in/1.9 cm) ribbon that travels perpendicular to the paper motion, as in conventional typwriters. Only the latter type of ribbon drive is capable of two-color printing.

In the impact type of printers, the paper and the ribbon, when used as the inking mechanism, should not move during the print cycle. However, excessive dwell time the time it takes the impact component to make contact between the paper and the ribbon, can cause the printed character to be smeared in the direction of paper travel. To reduce smearing, some printers use type slugs having character sets with thinner lines in the segments of the character that are perpendicular to the paper travel. Both the "smearing" and the specially designed characters tend to affect the legibility of the printed information.

Generally, either of two types of feed mechanism is employed: sprocket (including tractor-mounted pins) or friction. The sprocket/pin type requires edge-perforated paper. Some printers can use either perforated or unperforated paper in different widths, giving the user a wide choice. Since the sprocket/pin type provides more positive control of the paper, the higher-speed printers use that type of feed.

Some printers employing the non-impact type of mechanism, such as the electrostatic, electrolytic and thermal types, do not need to stop paper during the print cycles.

Associated with the paper feed are controls that advance the paper between print cycles. The timing and coordination between the printing action and paper movement are crucial to good legibility. Some printers can advance the paper at two different speeds; a slow speed for normal line-to-line stepping, and a higher speed for slewing

when several lines are skipped. The skipping of lines (vertical formatting) can be controlled by operator action, by components incorporated within the printer or by control signals from an interconnected device. In addition to the controls for paper advance, other controls are incorporated such as end-of-paper (forms) stop, paper-jam stop, and ribbon-jam stop.

Printer controls fall into two broad categories: those that are internal, and those that are accessible to the operator. The former may be integrated with the printer mechanism or the paper control mechanism, or may have provision in the interfacing logic to accept control signals from interconnected devices. The controls accessible to the operator range from simple panel controls (OFF/ON, PRINT) to full keyboards augmented with special function keys. Many printers have both very complex local operator control features and sophisticated internal logic that accepts control signals from interconnected devices.

The interface logic couples the printer to external devices. These interfaces may include a teletype-compatible current loop, or may conform to the electrical and logic specifications of the Electronic Industry Association (EIA) RS-232 standards, or may provide Diode Transistor Logic/Transistor-Transistor Logic (DTL/TTL) signal levels. Some printers have built-in data sets or modems (modulator-demodulators) which convert the transmitted binary character code voltages into audible tones or frequencies that are acceptable to the communications lines and which convert the received tones or frequencies to the binary signal needed by the print mechanisms. Many printers have switch-selectable input/output characteristics, permitting a variety of data rates and electrical and logic interfaces. Synchronous or asynchronous data transmission and reception between the printers and interconnected devices can occur simultaneously (full-duplex mode) or, by switch selection, in one-way transfer at a time (half-duplex). Many printers operate in a

receive only (RO) or simplex (interconnected device-to-printer only) mode.

The performance parameters of printers generally fall into one of two major interrelated areas: those that affect the legibility of the presented information, and those that are related to the particular operational mode(s) in which the printer is used. Both areas rely on comprehensive planned/programmed and fault correction maintenance activities.

The legibility performance is dependent on many factors, including the contrast between the printed characters and the background, the ambient illumination, the character size/spacing/font, the method of forming the characters and the printing speed. The type of paper used is a determinant of contrast; in general the sensitized papers provide less contrast than the non-sensitized. The amount of ambient illumination may or may not be a serious factor; some printers incorporate internal illumination of the printed paper. Of course, the contrast between black characters and the background is different than that of red characters. Measures of overall legibility are determined statistically.

The operational performance capability of printers also depends on the capability of the basic elements, with certain factors having a greater impact than others. These include the paper width, the print mechanism (impact or non-impact), the availability of two-color printing to differentiate between alarm and non-alarm data, the number of printed characters/line (columns), the number of character types that can be printed, the accessibility of the printed paper for viewing of information as it is being printed or for annotation during operation if required and ambient lighting.

The amount of maintenance required primarily depends on the type of print and ink mechanism and the operating speed. Some non-impact printers require addition of liquids (toners, ink) or storage of

sensitized paper in controlled environments such as refrigerators. Hence, all printers depend on scheduled maintenance. Faults or degradation in performance between scheduled maintenance periods usually are detected visually, backed up by "trouble" light indications -- out-of-paper, out-of-ink, paper-jam, ribbon-jam, smearing, etc. The more sophisticated printers may have periodic internal or interconnected computer-generated off-line/on-line diagnostic checks.

Inasmuch as printers are manufactured for a wide range of users and applications, tamper switches are not incorporated therein. However, printers do incorporate provisions for reducing the effects of RFI and EMI since they normally operate in an environment with other equipments, e.g., computers, memory devices and CRT displays.

The more complex printers can be either purchased or leased; the simpler ones can only be purchased. Under lease arrangements maintenance is provided by the lessor, and the cost of maintenance may be included in the lease price or may be charged on a per visit/per hour basis. For purchased printers, maintenance may be provided by the seller on a per visit/per hour cost basis, or the purchaser may arrange for his own maintenance.

Serial and RO printers generally can be obtained either by an outright purchase or by lease. Purchase prices vary from about $600 to $8,000, with an average about $3,000. Lease cost range from about $40 per month to $140 per month with an average of about $80 per month.

SERIAL AND READ-ONLY PRINTERS

Manufacturer	Comstar Corp. 7413 Washington Ave. So. Edina, MN 55435 (612) 941-4454	Daconics 925 Thompson Place Sunnyvale, CA 94086 (408) 732-2634	Data Interface Assoc P.O. Box 33 Brookfield Ctr, CT 06805 (203) 792-0290
Model	Concept 30	2911	D1-240
Evaluation Guide Procedure VII-2.A		NRC Identification No.	

PERFORMANCE DATA

Print & Ink Mechanism	Impact wheel, ink roller	Impact daisy disk[1], ribbon	Non-impact magnetic[1], 10x12 dot matrix
Char. Set	63 char — ASCII	96 char — ASCII	96 char ASCII/Baudot
Print Rate	30cps	30cps	240cps
Feed Controls			
Char./inch (cm)	10 (3.9)	10/12 (3.9/4.7)	10 (3.9)
Lines/inch (cm)	6 (2.4)	6 (2.4)[2]	6 (2.4)
Char./Line	132	132	80
Slew Speed, i/s (cm/s)	96 (244)	4 (10)	1½ (3.8)
Forms Feed	Pin feed	Pin feed	Pin feed
Forms Format	None	Up & down[2]	None
Forms	6 part, 3 to 14⅞in (7.6 to 37.8cm)	6 part, 15in (38.1cm)	1 part, 8½in (21.6cm)
Printer Controls	End-of-forms stop	Print error stop	End-of-forms stop, Print error stop (opt.)
Buffer Size	Information not available	Information not available	128 char
Transfer Rate	Information not available	30cps — parallel	50Kcps — parallel
Interfacing	RS232C, 20mA loop, DTL/TTL	DTL/TTL, HP 2100 Series minis, DEC PDP-8 minis, XDS Sigma Series	RS232C DTL/TTL

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

1. Uses Diablo Hy Type-printer mechanism
2. 48 positions/inch

1. Uses ordinary paper

INSTALLATIONS

SERIAL AND READ-ONLY PRINTERS

Manufacturer	Data Computing, Inc. Phoenix, AZ	Diablo Systems Inc. 24500 Industrial Blvd. Hayward, CA 94545 (415) 783-3910	A.B. Dick/Videograph Operation 5700 W. Touhy Ave. Chicago, IL 60648 (312) 763-1900
Model	Typeliner	HyType 1	Videojet 960
Evaluation Guide Procedure VII-2.A	NRC Identification No.		

PERFORMANCE DATA

Print & Ink Mechanism	Impact	Impact Daisy Disk, ribbon	Non-impact ink jet 9x11 dot matrix
Char. Set	ASCII	96 char — ASCII	64 char — ASCII
Print Rate	100 line/min.	30cps	250cps
Feed Controls			
Char./inch (cm)	Information not available	10/12 (3.9/4.7)	5 to 15 (2 to 5.9)
Lines/inch (cm)	Information not available	Variable	6 (2.4)
Char./Line	Information not available	132	132
Slow Speed, i/s (cm/s)	Information not available	4 (10)	Information not available
Forms Feed	Information not available	Pin feed	Information not available
Forms Format	Information not available	Up & down	Information not available
Forms	Fan, 6 ply	6 part 15in (38.1cm)	1 part
Printer Controls	Information not available	Information not available	Information not available
buffer Size	Information not available	Information not available	Information not available
Transfer Rate	Information not available	Information not available	Information not available
Interfacing	Information not available	Input: Print; Output: Printer Ready	Information not available

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Line adv. = 42msec. Print line width = 13.2in (33.5cm)	Printer mechanism for OEM applications

INSTALLATIONS

SERIAL AND READ-ONLY PRINTERS

Manufacturer	Eclectic 2830 Walnut Hill Lane Dallas, TX 75229 (214) 358-1307	Extel Corporation 310 Anthony Trail Northbrook, IL 60062 (312) 272-8650	General Instrument Co. Hicksville, NY
Model	760	RO/48 and RO/72E	126
Evaluation Guide Procedure VII-2.A		NRC Identification No.	

PERFORMANCE DATA

Print & Ink Mechanism	Impact matrix 5x7 Dot matrix	Impact matrix 5x7 Dot matrix	Impact
Char. Set	64 char — ASCII	64 char — ASCII/Baudot	Information not available
Print Rate	165cps	15cps	600 line/min.
Feed controls			
Char./Inch (cm)	10 (3.9)	10 (3.9)	Information not available
Lines/Inch (cm)	6 (2.4)	Information not available	Information not available
Char./Line	132	50 (RO/48), 74 (RO/72E)	Information not available
Slow Speed i/s (cm/s)	4 (10)	Information not available	Information not available
Forms Feed	Pin feed	Friction	Information not available
Forms Format	2 channel	None	Information not available
Forms	6 part 3½ to 14⅞in (8.9 to 37.8cm)	3 part 6 or 8in (15.2 or 20.3cm)	Fan, 6 ply
Printer Controls	End-of-forms stop, carriage skip stop	Information not available	Information not available
Buffer Size	132 char	None	Information not available
Transfer Rate	75Kcps — Parallel	110 baud — Serial	Information not available
Interfacing	DTL/TTL, DEC PDP-8, 11 minis	Information not available	Information not available

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Drum line printer
Line adv. = 20msec.
Print line width = 8in (20.3cm), Char. height = 0.125in (3.2mm)

INSTALLATIONS

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SERIAL AND READ-ONLY PRINTERS

Manufacturer	IBM 1133 Westchester Ave. White Plains, NY 10604 (914) 696-1900	IBM 1133 Westchester Ave. White Plains, NY 10604 (914) 696-1900	ITT (Data Equipment & Systems Division) E. Union Ave. E. Rutherford, NJ 07073 (201) 935-3900
Model	1053	5213	3030 RO

Evaluation Guide Procedure VII-2.A NRC Identification No.

PERFORMANCE DATA

Print & Ink Mechanism	Impact Selectric, ribbon	Impact matrix, 7x7 dot matrix	Non-impact thermal, 5x7 dot matrix
Char. Set	Information not available	64 char — EBCDIC	96 char — ASCII
Print Rate	14.8cps	85cps	30cps
Feed Controls			
Char./Inch (cm)	10/12 (3.9/4.7)	10 (3.9)	10 (3.9)
Lines/Inch (cm)	6/8 (7.4/3.1)	6 (2.4)	6/3 (7.4/1.2)
Char./Line	130	132	80
Slow/Speed, i/s (cm/s)	Information not available	12 (30.5)	Information not available
Forms feed	Pin feed	Pin feed	Friction
Forms Format	Information not available	Vertical & bi-direct., Horizontal	None
Forms	6 part	6 part, 3 to 14⅞in (7.6 to 37.8cm)	1 part
Printer Controls	Information not available	Information not available	Information not available
Buffer Size	None	Information not available	Information not available
Transfer Rate	Information not available	Information not available	Information not available
Interfacing	IBM 1800	IBM S/3 Model 6	RS232C

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

RO version of 1052 teleprinter

INSTALLATIONS

SERIAL AND READ-ONLY PRINTERS

Manufacturer	ITT (Data Equipment & Systems Division) E. Union Ave. E. Rutherford, NJ 07073 (201) 935-3900	SCM Corp. (Kleinschmidt Div.) Deerfield IL 60015 (312) 945-1000	Log Abax Acrueil, France
Model	3010-15 Envoy RO	Telescripter	L x 50
Evaluation Guide Procedure VII-2.A	NRC Identification No.		

PERFORMANCE DATA

Print & Ink Mechanism	Impact cylinder, ribbon	Impact (ribbonless)	Impact
Char. Set	96 char -- ASCII	ASCII	ASCII
Print Rate	10 cps	10 cps	50 cps
Feed Controls			
Char./Inch (cm)	10/12 (3.9/4.7)	Information not available	Information not available
Lines/Inch (cm)	6 (2.4)	4 (1.6)	Information not available
Char./Line	72/85	Information not available	233
Slow Speed, i/s (cm/s)	Information not available	Information not available	Information not available
Forms Feed	Pin feed	Information not available	Information not available
Forms Format	None	Information not available	Information not available
Forms	Information not available	Roll, 3 ply	Roll, Fan, Form, 6 ply
Printer Controls	Information not available	Information not available	Information not available
Buffer Size	None	Information not available	Information not available
Transfer Rate	Information not available	Information not available	Information not available
Interfacing	Information not available	Information not available	Information not available

PHYSICAL DATA

Environmental Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Mobile installation, Line adv. = 120msec, Carr ret = 120msec, Print line width = 4in (10cm) Char height = 0.13in (3.3mm)	Char height = 0.1in (2.5mm)

INSTALLATIONS

SERIAL AND READ-ONLY PRINTERS

Manufacturer	Memorex 1180 Shulman Ave. Santa Clara, CA 95050 (408) 247-1000	Mini-Systems, Inc. 4935 Boone Avenue No. Minneapolis, MN	Mite Data Equipment 446 Blake St. New Haven, CT 06515 (203) 387-2572
Model	1250, 1251 and 1252	Series 160	123/150 RO
Evaluation Guide Procedure VII-2.A	NRC Identification No.		

PERFORMANCE DATA

Print & Ink Mechanism	Impact cartridge (see notes), ribbon	Impact wheel (see notes), ink roller	Impact cylinder, ribbon
Char. Set	94 char — ASCII	64 char — ASCII	64 char — ASCII
Print Rate	10/15/30/60 cps	100 cps	10/15 cps (sw sel)
Feed Controls			
Char./Inch (cm)	10 (3.9)	10 (3.9)	10.8/10 (4.2/3.9)
Lines/Inch (cm)	6 (2.4)	6 (2.4)	6 (2.4)
Char./Line	120	136	80/75
Slow Speed, i/s (cm/s)	15 (38.1)	8¾ (22.2)	Information not available
Forms Feed	Pin feed	Pin feed	Pin feed
Forms Format	Option	8 channel tape	None
Forms	6 part, up to 14⅞in (37.8cm)	6 part	6 part
Printer Controls	End of forms stop	Information not available	None
Buffer Size	256 to 512 char	Information not available	None
Transfer Size	1,200 bps — Serial	Information not available	Information not available
Interfacing	RS232C Integral modem or coupler	Data Gen Nova minis Dig Comp Cont minis	RS232C 20mA loop DTL/TTL, integral modem

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Interchangeable	Uses Printer Technology Printec 100 printer

INSTALLATIONS

SERIAL AND READ-ONLY PRINTERS

Manufacturer	NCR (Industrial Products Division 3131 So. Dixie Hwy. Dayton, OH 45439 (513) 559-3970	Olivetti America One Park Avenue New York, NY 10016 (212) 371-5500	Olivetti America One Park Avenue New York, NY 10016 (212) 371-5500
Model	260 RO	SV 40	RE 315 RO
Evaluation Guide Procedure VII-2.A		NRC Identification No.	

PERFORMANCE DATA

Print & Ink Mechanism	Non-impact thermal, 5x7 dot matrix	Impact cylinder, ribbon	Impact wheel, ribbon
Char. Set	96 char — ASCII	64 char — ASCII	64 char — Baudot
Print Rate	30 cps	40 cps	6.6/10/13.3 cps
Feed Controls			
Char./Inch (cm)	10 (3.9)	10 (3.9)	10 (3.9)
Lines/Inch (cm)	6 (2.4)	2/3/6 (0.8/1.2/2.4)	6 (2.4)
Char./Line	80	132	80
Slow Speed, i/s (cm/s)	Information not available	8 (20.3)	Information not available
Forms Feed	Friction	Pin feed	Pin feed
Forms Format	None	8 channel tape	Vertical (opt)
Forms	1 part, 8¾in (22.2cm)	5 part, 2 to 17in (5 to 43.2cm)	6 part, 8¼ to 9½in (21 to 24 cm)
Printer Controls	Information not available	End of forms stop, ribbon jam stop, forms jam stop (opt), stacker full stop (opt)	Information not available
Buffer Size	None	None	None
Transfer Rate	Information not available	400bps — Serial	Information not available
Interfacing	RS232C, DTL/TTL	DEC minicomputers, HP minicomputers	20mA loop, CCITT Stand-alone modem (opt)

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Paper tape (opt)

INSTALLATIONS

SERIAL AND READ-ONLY PRINTERS

Manufacturer	Olivetti America One Park Avenue New York, NY 10016 (212) 371-5500	Olivetti America One Park Avenue New York, NY 10016 (212) 371-5500	Olivetti America One Park Avenue New York, NY 10016 (212) 371-5500
Model	RE 318 and 338 RO	RE 339 RO	RE 405 RO
Evaluation Guide Procedure VII-2.A	NRC Identification No.		

PERFORMANCE DATA

Print & Ink Mechanism	Impact wheel, ribbon	Impact wheel, ribbon	Impact wheel, ribbon
Char. Set	64 char — ASCII	64 char — ASCII/BCD	64 char — Baudot
Print Rate	10 cps	15 cps	6.6/10/13/20/27 cps
Feed Controls			
Char./Inch (cm)	10 (3.9)	10 (3.9)	10 (3.9)
Lines/Inch (cm)	6 (2.4)	6 (2.4)	6 (2.4)
Char./Line	80 (318)/120 (338)	120	132
Slow Speed, i/s (cm/s)	Information not available	Information not available	Information not available
Forms Feed	Pin feed	Pin feed	Pin feed
Forms Format	Vertical (opt)	Vertical (opt)	Vertical (opt)
Forms	6 part	6 part	6 part
Printer Controls	Information not available	Information not available	Information not available
Buffer Size	None	None	None
Transfer Rate	Information not available	Information not available	Information not available
Interfacing	RS232C, 20mA loop, Stand-alone modem (opt), CCITT	RS232C, CCITT, Stand-alone modem (opt)	20mA loop

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

	Paper tape (opt)	Paper tape (opt)

INSTALLATIONS

SERIAL AND READ-ONLY PRINTERS

Manufacturer	Path Computer Equipment, Inc. Stamford, CT	Printer Technology, Inc. Sixth Road Woburn Ind. Park Woburn, MA 01801 (617) 935-4246	Remcom Systems, Inc. Garland, TX 75040
Model	1200	Printec-100	2780 Series
Evaluation Guide Procedure VII-2.A		NRC Identification No.	

PERFORMANCE DATA

Print & Ink Mechanism	Elect/optical	Impact 3 helix wheel, ink roller	Impact (drum line printer)
Char. Set	Information not available	64/96 char ASCII/EBCDIC	Information not available
Print Rate	1,200 lines/min	100 cps	400 or 600 lines/min
Feed Controls			
Char./Inch (cm)	Information not available	10 (3.9)	Information not available
Lines/Inch (cm)	Information not available	6 (2.4)	8 (3.1)
Char./Line	80 or 132	136	Information not available
Slow Speed, i/s (cm/s)	Information not available	8¾ ips	Information not available
Forms Feed	Information not available	Pin feed	Information not available
Forms Format	Information not available	8 channel tape	Information not available
Forms	Roll	6 part 4 to 16 in (10.1 to 40.6cm)	Roll, form
Printer Controls	Information not available	Information not available	Information not available
Buffer Size	Information not available	366 char (opt)	Information not available
Transfer Rate	Information not available	2,400 bps — Serial	Information not available
Interfacing	Information not available	RS232C, DTL/TTL	Information not available

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

	Printer for OEM applications	Line Adv. = 25 msec, Print Line Width = 13.2in (33.5cm), char height = .093in (2.4mm)

INSTALLATIONS

SERIAL AND READ-ONLY PRINTERS

Manufacturer	Repco 1940 Lockwood Way P.O. Box 7065 Orlando, FL 32804 (305) 843-8484	TC Systems, Inc. 3303 So. Rice Avenue Houston, TX 77027 (713) 626-3020	Teletype 5555 Touhy Ave. Skokie, IL 60076 (312) 982-2000
Model	Model 120	Videojet	Model 33 RO
Evaluation Guide Procedure VII-2.A	NRC Identification No.		

PERFORMANCE DATA

Print & Ink Mechanism:	Non-impact electro-static, 5x7 dot matrix	Non-impact ink jet, 9x11 dot matrix	Impact wheel, ribbon
Char. Set	64 char — ASCII	64 char — ASCII	64 char — ASCII
Print Rate	120 cps	250/750 cps	10 cps
Feed Controls			
Char./Inch (cm)	10 (3.9)	5 to 15 (2 to 5.9)	10 (3.9)
Lines/Inch (cm)	5/6 (2/2.4)	6 (2.4)	6/3 (2.4/1.2)
Char./Line	80	132	72
Slow Speed, i/s (cm/s)	Information not available	Information not available	Information not available
Forms Feed	Friction	Information not available	Pin feed
Forms Format	Information not available	8 channel tape	None
Forms	1 part	1 part	3 part
Printer Controls	Information not available	Information not available	Information not available
Buffer Size	128 to 256 char	132 char	None
Transfer Rate	Information not available	Information not available	110 bps — Serial
Interfacing	RS232C, TTL, Parallel	IBM 1130 & 1800	20mA loop, RS232C (opt)

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Uses A.B. Dick Videojet printer

INSTALLATIONS

SERIAL AND READ-ONLY PRINTERS

Manufacturer	Teletype 5555 Touhy Ave. Skokie, IL 60076 (312) 982-2000	Teletype 5555 Touhy Ave. Skokie, IL 60076 (312) 982-2000	Teletype 5555 Touhy Ave. Skokie, IL 60076 (312) 982-2000
Model	Model 35 RO	Model 37 RO	Model 38 RO

Evaluation Guide Procedure VII-2.A NRC Identification No.

PERFORMANCE DATA

Print & Ink Mechanism	Impact wheel, ribbon	Impact-type pallet, ribbon	Impact wheel, ribbon
Char. Set	64 char — ASCII	94/110/126 char	128 char — ASCII
Print Rate	10 cps	15 cps	10 cps
Feed Controls			
Char./Inch (cm)	10 (3.9)	10/12 (3.9/4.7)	10 (3.9)
Lines/Inch (cm)	6 (2.4)	6 (2.4)	6/3 (2.4/1.2)
Char./Line	72	72/82/132	132
Slew Speed, i/s (cm/s)	60 (152.4)	45 (114.3)	Information not available
Forms Feed	Pin feed	Pin feed	Pin feed
Forms Format	Information not available	Information not available	Information not available
Forms	6 part	6 part	6 part
Printer Controls	Information not available	Information not available	Information not available
Buffer Size	None	None	None
Transfer Rate	110 bps — Serial	150 bps — Serial	110 bps — Serial
Interfacing	20mA loop, RS232C (opt)	RS232C	RS232C, 20mA loop, Integral mod

PHYSICAL DATA

Environmental Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

INSTALLATIONS

SERIAL AND READ-ONLY PRINTERS

Manufacturer	Teletype 5555 Touhy Ave. Skokie, IL 60076 (312) 982-2000	Texas Instruments (Digital Systems Div.) 12203 SW Freeway Stafford, TX 77577 (713) 494-5115	Texas Instruments (Digital Systems Div.) 12203 SW Freeway Stafford, TX 77577 (713) 494-5115
Model	Inktronic RO	721S, 731S, 722S	750 and 751

Evaluation Guide Procedure VII-2.A NRC Identification No.

PERFORMANCE DATA

Print & Ink Mechanism	Non-impact ink jet, 8x10 dot matrix	Non-impact thermal, 5x7 dot matrix	Non-impact thermal, 5x7 dot matrix
Char. Set	64/93 char ASCII	94 char - - ASCII	ASCII (750) Baudot (751)
Print Rate	120 cps	30 cps	30 cps
Feed Controls			
Char./Inch (cm)	10 (3.9)	10 (3.9)	10 (3.9)
Lines/Inch (cm)	6 (2.4)	6 (2.4)	6 (2.4)
Char./Line	80	80	80
Slow Speeds (cm/s)	Information not available	30 (76)	30 (76)
Forms Feed	Friction	Friction	Friction
Forms Format	Information not available	None	None
Forms	1 part	1 part	1 part
Printer Controls	Information not available	Information not available	Information not available
Buffer Size	None	None	None
Transfer Rate	Information not available	Information not available	Information not available
Interfacing	RS232C, Parallel	RS232C (712S), 20mA loop TTY Parallel (722S), Integral modem (opt), (721S)	TTL Parallel (750), 20mA loop (751), CCITT (751)

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Printer mechanism for OEM applications

INSTALLATIONS

SERIAL AND READ-ONLY PRINTERS

Manufacturer	UNIVAC P.O. Box 500 Blue Bell, PA 19422 (215) 825-2560	Xerox Corporation Rochester, NY
Model	0769	Mobile Printer
Evaluation Guide Procedure VII-2.A	NRC Identification No.	

PERFORMANCE DATA

Print & Ink Mechanism	Impact wheel, ink roller	Electrostatic
Char. Set	63 char — ASCII/EBCDIC	Information not available
Print Rate	2[illegible] cps	27.7 cps
Feed Controls		
Char./Inch (cm)	10 (3.9)	12 (4.7)
Lines/Inch (cm)	6 (2.4)	Information not available
Char./Line	132	Information not available
Slow Speed, i/s (cm/s)	25 (63.5)	Information not available
Forms Feed	Pin feed	Information not available
Forms Format	None	Information not available
Forms	6 part to 14 in (37.8cm)	Roll
Printer Controls	Out-of-paper stop	Information not available
Buffer Size	None	Information not available
Transfer Rate	Information not available	Information not available
Interfacing	Information not available	Information not available

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained

NOTES

Printer mechanism for OEM applications	Vehicle installations. Line adv. = 1,300msec. Print line width = 3in (7.6cm) Char height = .08in (2.0cm)

INSTALLATIONS

725 224

DATA LOGGING, DIGITAL AND LIST PRINTERS

Printers are almost universally employed to create visual records of a display of information. Even though a number of types are readily available with wide ranges of capabilities, all printers are composed of four generic elements: print and ink mechanism, paper feed controls, printer operation controls, and interfacing elements. The use of printers in physical security systems is outlined in Volume VIII, Section 1 (Alarm Signalling Systems).

Many printers can interface with a wide range of devices (CRT displays, computers, magnetic tape transports), while others can only interface with a very limited number. Some printers have a keyboard that permits local entry of information and interchange of information with other interconnected devices, while others can only receive and print information derived from other sources. Among the wide choices of interfacing capabilities there is also the opportunity to select different printer information input/output data rates, print speeds, numbers of characters and fonts, numbers of characters per line, type of paper, paper feed, and so on.

The data logging, digital and list printers have a common set of characteristics that distinguish them from other general purpose printers: they operate in a receive only (RO) mode of information transfer, they print one line at a time, almost all of them ar limited to printing 32 or less characters per line, and they usually have a numeric only or limited alphanumeric printing capability. Some printers in this category have impact print mechanisms that use field replaceable print wheels, allowing the user to select or change fonts. For the most part this selection feature is provided by printers with less than 16 characters per line. In other respects, such as printing speed, ink supply, paper selection and type of print mechanism the data logging, digital and list printers vary widely in capability.

By far the most widely used type of print mechanism is the impact type. However, with technical advances, and with the need to reduce the noise level in operating environments, more non-impact printers of various types are becoming available. Impact printers operate much like a conventional typewriter. An impression is transferred from a type slug on a ball, drum, chain or wheel to the paper. Ink is provided by a ribbon or a roller, or is incorporated in the paper itself. Some printers are equipped with dual color (red and black) ink ribbons to distinguish critical information. Multiple copies may be obtained, as with a typewriter. Another type of impact mechanism uses a solenoid-driven matrix of points instead of a type slug, forming a dot matrix character on the paper. Different sizes of dot matrices are provided with different machines. The 5 x 7 dot matrix is most common, but other matrices offering a higher degree of legibility are available: 7 x 7, 7 x 9, 5 x 9.

There are three varieties of non-impact print mechanisms: electrode, electro-optical and spray. In an electrolytic printer the electrodes form the image by the transfer of metal ions from the positively charged metal electrode to chemically-treated electrosensitive paper. The electrodes charge the surface of the paper, and the latent image formed by the charge attracts a toner which is developed by either heat or solvent to produce the character. In a thermal printer, the electrodes are resistive and are heated by current pulses to form the image on heat-sensitive paper. The second class of mechanisms uses electro-optics to flash an optical image on photosensitive paper, forming the character. The third class is the "video-jet" type that sprays controlled jets or drops of ink onto the page, generating a dot matrix that has very good legibility -- the dots are so close together that the character appears to be composed of straight lines. None of the non-impact-type printers makes copies or prints in two colors.

Ribbons for some impact printers are mounted on spools whose width is equal to the column width; the ribbon travels in the same direction as the paper. Other printers use a narrow (3/4 in/1.9 cm) ribbon that travels perpendicular to the paper motion, as in conventional typwriters. Only the latter type of ribbon drive is capable of two-color printing.

In the impact type of printers, the paper and the ribbon when used as the inking mechanism should not move during the print cycle. However, excessive dwell time, the time it takes the impact component to make contact between the paper and the ribbon, can cause the printed character to be smeared in the direction of paper travel. To reduce smearing, some printers use type slugs having character sets with thinner lines in the segments of the character that are perpendicular to the paper travel. Both the "smearing" and the specially designed characters tend to affect the legibility of the printed information.

Generally, either of two types of feed mechanism is employed: sprocket (including tractor-mounted pins) or friction. The sprocket/pin type requires edge-perforated paper. Some printers can use either perforated or unperforated paper in different widths, giving the user a wide choice. Since the sprocket/pin type provides more positive control of the paper, the higher-speed printers use that type of feed.

Some printers employing the non-impact type of mechanism, such as the electrostatic, electrolytic and thermal types, do not need to stop paper during the print cycles.

Associated with the paper feed are controls that advance the paper between print cycles. The timing and coordination between the printing action and paper movement are crucial to good legibility. Some printers can advance the paper at two different speeds; a slow speed for normal line-to-line stepping, and a higher speed for slewing when several lines are skipped. The skipping of lines (vertical for-

matting) can be controlled by operator action, by components incorporated within the printer or by control signals from an interconnected device. In addition to the controls for paper advance, other controls are incorporated such as end-of-paper (forms) stop, paper-jam stop, and ribbon-jam stop.

Printer controls fall into two broad categories: those that are internal, and those that are accessible to the operator. The former may be integrated with the printer mechanism or the paper control mechanism, or may have provision in the interfacing logic to accept control signals from interconnected devices. The controls accessible to the operator range from simple panel controls (OFF/ON, PRINT) to full keyboards augmented with special function keys. Many printers have both very complex local operator control features and sophisticated internal logic that accepts control signals from interconnected devices.

The interface logic couples the printer to external devices. These interfaces may include a teletype-compatible current loop, or may conform to the electrical and logic specifications of the Electronic Industry Association (EIA) RS-232 standards, or may provide Diode Transistor Logic/Transistor-Transistor Logic (DTL/TTL) signal levels. Some printers have built-in data sets or modems (modulator-demodulators) which convert the transmitted binary character code voltages into audible tones or frequencies that are acceptable to the communications lines and which convert the received tones or frequencies to the binary signal needed by the print mechanisms. Many printers have switch-selectable input/output characteristics, permitting a variety of data rates and electrical and logic interfaces. Synchronous or asynchronous data transmission and reception between the printers and interconnected devices can occur simultaneously (full-duplex mode) or, by switch selection, in one-way transfer at a time (half-duplex). Many printers operate in a receive only (RO) or simplex (interconnected device-to-printer only) mode.

The performance parameters of printers generally fall into one of two major interrelated areas: those that affect the legibility of the presented information, and those that are related to the particular operational mode(s) in which the printer is used. Both areas rely on comprehensive planned/programmed and fault correction maintenance activities.

The legibility performance is dependent on many factors, including the contrast between the printed characters and the background, the ambient illumination, the character size/spacing/font, the method of forming the characters and the printing speed. The type of paper used is a determinant of contrast; in general the sensitized papers provide less contrast than the non-sensitized. The amount of ambient illumination may or may not be a serious factor; some printers incorporate internal illumination of the printed paper. Of course, the contrast between black characters and the background is different than that of red characters. Measures of overall legibility are determined statistically.

The operational performance capability of printers also depends on the capability of the basic elements with certain factors having a greater impact than others. These include the paper width, the print mechanism (impact or non-impact), the availability of two-color printing to differentiate between alarm and non-alarm data, the number of printed characters/line (columns), the number of character types that can be printed, the accessibility of the printed paper for viewing of information as it is being printed or for annotation during operation if required and ambient lighting.

The amount of maintenance required primarily depends on the type of print and ink mechanism and the operating speed. Some non-impact printers require addition of liquids (toners, ink) or storage of sensitized paper in controlled environments such as refrigerators. Hence, all printers depend on scheduled maintenance. Faults or degradation in performance between scheduled maintenance periods

usually are detected visually, backed up by "trouble" light indications -- out-of-paper, out-of-ink, paper-jam, ribbon-jam, smearing, etc. The more sophisticated printers may have periodic internal or interconnected computer-generated off-line/on-line diagnostic checks.

Inasmuch as printers are manufactured for a wide range of users and applications, tamper switches are not incorporated therein. However, printers do incorporate provisions for reducing the effects of RFI and EMI since they normally operate in an environment with other equipments, e.g., computers, memory devices and CRT displays.

The more complex printers can be either purchased or leased; the simpler ones can only be purchased. Under lease arrangements maintenance is provided by the lessor, and the cost of maintenance may be included in the lease price or may be charged on a per visit/per hour basis. For purchased printers, maintenance may be provided by the seller on a per visit/per hour cost basis, or the purchaser may arrange for his own maintenance.

The costs of these printers reflect the wide range of capabilities available, the purchase prices ranging from about $200 to about $15,000 with an average of about $2600.

DATA LOGGING, DIGITAL AND LIST PRINTERS

Manufacturer	Anadex Instruments, Inc. 7833 Haskell Ave. Van Nuys, CA 91406 (213) 782-9527	Beckman Instruments (Electronic Instru. Div.) 3900 River Rd. Schiller Pk, IL 61076 (312) 617-3300	Clary (Precision Instruments Divison) 320 W. Clary Ave. San Gabriel, CA 91776 (213) 287-6111
Model	DP-750 Series	Model 1454	LP Series

Evaluation Guide Procedure VII-2.A NRC Identification No.

PERFORMANCE DATA

Print & Ink Mechanism	Impact	Impact, ribbon	Impact, ribbon/ ink roller
Print Position	21 col	7 to 21 col in 7 col increments	21 col
Char. Set			
Numerics/Sym.	Information not available	21 char	16 char
Alphanumerics	42 char — ASCII	Information not available	Information not available
Printing Rate			
Numerics Only	Information not available	3 lps (63cps)	15 lps (315 cps)
Alphanumerics	25 cps	Information not available	Information not available
Spacing			
Columns/Inch (cm)	Information not available	8 (3.1)	Information not available
Lines/Inch (cm)	Information not available	5 (2)	10 (3.9)
Operation	Synch & asynch	Synch & asynch	Synch & asynch
Paper			
Roll	Information not available	3½in (8.9cm) wide	200ft (61m) long x 3½in (8.9cm) wide
Fan-Fold	Information not available	3½in (8.9cm) wide	2-part 5½in (14cm) long x 3½in (8.9cm) wide
Controls	Information not available	*Inputs:* Print; Line Advance; Col Blank; Color; Decimal Point; *Outputs:* Printer Lock- out; *Panel:* On/Off; Stand by; Paper Ad- vance; Manual Print	*Inputs:* Print; Line Advance; Col Advance; *Outputs:* Printer Lockout; Printer Ready; *Panel:* On/Off; Paper Advance

PHYSICAL DATA

Environment			
Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

RS232C and RS363 compatible

INSTAL' ATIONS

DATA LOGGING, DIGITAL AND LIST PRINTERS

Manufacturer	Control Data 8100 34th Ave. So. Minneapolis, MN 55440 (612) 888-5555	Datadyne Corp. Bldg. 37A Valley Forge Ctr. King of Prussia, PA 19406 (215) 265-1793	Datadyne Corp. Bldg. 37A Valley Forge Ctr. King of Prussia, PA 19406 (215) 265-1793
Model	9310 Paragraph Printer	318	722

Evaluation Guide Procedure VII-2.A NRC Identification No.

PERFORMANCE DATA

Print & Ink Mechanism	Impact Ink roller	Impact	Impact Ribbon/ink roller
Print Position	120 col (See note 1)	6 to 18 col	1 to 22 col in 1-col increments
Char. Set			
Numerics/Sym.	Information not available	15 char	15 char
Alphanumerics	64/96 char — ASCII	64 char — ASCII	64 char — ASCII
Printing Rate			
Numerics Only	Information not available	54 cps	880 cps
Alphanumerics	15 col/sec (390 cps) (See note 2)	54 cps	220 cps
Spacing			
Columns/Inch (cm)	10 (3.9)	10 (3.9)	10 (3.9)
Lines/Inch (cm)	6 (2.4)	6 (2.4)	6 (2.4)
Operation	Asynch	Synch & asynch	Synch & asynch
Paper			
Roll	Information not available	Information not available	200ft (61m) long, 2½in (6.3 cm) wide
Fan-Fold	8 or 11in (20.3 or 28cm) long by 5⅓in (13.5cm) wide		8in (20.3) long, 2½in (6.3cm) wide
Controls	*Inputs:* Print; Printer Ready; Col Adv; Data ID; *Outputs:* Printer Lockout; Printer Ready; *Panel:* On/Off; Paper Advance	Information not available	*Inputs:* Print; End-of-Line Auto Adv; Col Adv; Line Advance; *Outputs:* Printer Lockout; Printer Ready; *Panel:* On/Off; Paper Advance, Inhibit

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	120V, 60Hz	Information not obtained	115V, 60Hz

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

(1) Prints a paragraph of up to 26 lines
(2) 195 lpm for 120 char line

INSTALLATIONS

DATA LOGGING, DIGITAL AND LIST PRINTERS

Manufacturer	DI/AN Controls 944 Dorchester Ave. Boston, MA 02125 (617) 288-7700	DI/AN Controls 944 Dorchester Ave. Boston, MA 02125 (617) 288-7700	Elec-Trol 26477 N. Golden Valley Rd. Saugus, CA 91350 (805) 252-8330
Model	Series DL	Series N	PR 1000 Series
Evaluation Guide Procedure VII-2.A	NRC Identification No.		

PERFORMANCE DATA

Print & Ink Mechanism	Impact Ink roller	Impact Ink roller	Non-impact 5x9 or 7x9 dot matrix
Print Position	4 to 16 col in 4-col increments	4 to 32 col in 4-col increments	16 col (7x9 matrix) 20 col (5x9 matrix)
Char. Set			
Numerics/Sym.	16 char	16 char	Information not available
Alphanumerics	48 char	48 char	96 char
Printing Rate			
Numerics Only	40 lps (640 cps)	40 lps (1,280 cps)	Information not available
Alphanumerics	20 lps (320 cps)	20 lps (640 cps)	4 lps (64/80 cps)
Spacing			
Columns/Inch (cm)	10 (3.9)	10 (3.9)	Information not available
Lines/Inch (cm)	6 (2.4)	6 (2.4)	Information not available
Operation	Synch & asynch	Synch & asynch	Information not available
Paper			
Roll	Information not available	3¼in (8.2cm) wide	Information not available
Fan Fold	3 part, 8½in (21.6cm) long x 2in (5cm) wide	3 part, 8½in (21.6cm) long x 3¼in (8.2cm) wide	Information not available
Controls	*Inputs:* Print; Line Advance; *Outputs:* Printer Lockout; Printer Ready; Out-of-Paper; *Panel:* On/Off; Standby; Paper Advance; Forms Control	*Inputs:* Print; Line Advance; *Outputs:* Printer Lockout; Printer Ready; *Panel:* On/Off; Standby; Paper Advance; Forms Control	Information not available

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	117V, 50/60Hz	117V, 50/60Hz	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

INSTALLATIONS

DATA LOGGING, DIGITAL AND LIST PRINTERS

Manufacturer	Esterline Angus P.O. Box 24000 Indianapolis, IN 46224 (317) 244-7611	Hewlett-Packard 1501 Page Mill Rd. Palo Alto, CA 94304 (408) 246-4300	Leeds & Northrup Sunnytown Pke North Wales, PA 19454 (215) 643-2000
Model	P-500	5050B	273(
Evaluation Guide Procedure VII-2.A	NRC Identification No.		

PERFORMANCE DATA

Print & Ink Mechanism	Impact, ribbon	Impact, ink roller	Impact, ribbon
Print Position	4 or 12 to 20 col.	18 col.	21 col.
Char. Set			
Numerics/Sym.	16 char.	16 char.	16 char.
Alphanumerics	16 char. on 3 col.	Information not available	Information not available
Printing Rate			
Numerics Only	2.2lps (44cps)	20ips (360cps)	3lps (63cps)
Alphanumerics	2.2lps (44cps)	Information not available	Information not available
Spacing			
Columns/Inch (cm)	Information not available	6.3 (2.5)	Information not available
Lines/Inch (cm)	Information not available	3½ to 4½ (1.3 to 1.8) adjustable	Information not available
Operation	Synch.	Asynch.	Information not available
Paper			
Roll	Information not available	250ft (76m) long x 3in (7.6cm) wide	160ft (49m) long x 3½in (9cm) wide
Fan-Fold	5½in (14cm) long x 3½in (9cm) wide	8½in (21.6cm) long x 3in (7.6cm) wide	3½in (9cm) wide
Controls	*Inputs:* Print; Line Advance; Color; Col. Locate; Group Inhibit; *Outputs:* Printer Ready; Printer Lockout; Col. Count; *Panel:* On/Off; Manual Print	*Inputs:* Print; *Outputs:* Printer Lockout	Information not available

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	120/240V, 50 to 400Hz	110/220V, 50/60Hz	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

INSTALLATIONS

DATA LOGGING, DIGITAL AND LIST PRINTERS

Manufacturer	Litton/Datalog 1770 Walt Whitman Rd. Melville, NY 11746 (516) 694-8300	Litton/Datalog 1770 Walt Whitman Rd. Melville, NY 11746 (516) 694-8300	Mohawk Data Sciences Palisade St. Herkimer, NY 13350 (315) 866-6040
Model	MC 3434	MC 4600	1200 and 1600
Evaluation Guide Procedure VII-2.A	NRC Identification No.		

PERFORMANCE DATA

Print & Ink Mechanism	Non-impact CRT Fibre-optic	Non-impact CRT Fibre-optic	Impact Ribbon
Print Position	32 col.	32 col.	5 to 16 col. in 1-col. increments
Char. Set			
Numerics/Sym.	Information not available	15 char.	16 char.
Alphanumerics	64 char. — ASCII	64 char. — ASCII	Information not available
Printing Rate			
Numerics Only	Information not available	100lps (3200cps)	30lps (480cps)
Alphanumerics	100lps (3200cps)	100lps (3200cps)	Information not available
Spacing			
Columns/Inch (cm)	Information not available	Information not available	10 (3.9)
Lines/Inch (cm)	6 (2.4)	Information not available	6 (2.4)
Operation	Synch. & asynch.	Synch. & asynch.	Synch.
Paper			
Roll	Information not available	Information not available	200ft (61m) long x 2¼in (5.7cm) wide
Fan-Fold	Information not available	Information not available	2¼in (5.7cm) wide
Controls	*Inputs:* Print; Line Advance; Col. Advance; *Outputs:* Printer Lockout; Printer Ready; *Panel:* On/Off; Paper Advance	*Inputs:* Print; Line Advance; Col. Advance; *Outputs:* Printer Lockout; Printer Ready; *Panel:* On/Off; Print	*Inputs:* Print; Line Advance; *Outputs:* Printer Lockout; Printer Ready; *Panel;* On/Off; Print; Print Once; Inhibit

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	115V, 400Hz	115/230V, 50/60Hz	115/230V, 50/60Hz

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

INSTALLATIONS

DATA LOGGING, DIGITAL AND LIST PRINTERS

Manufacturer	Mohawk Data Sciences Palisade St. Herkimer, NY 13350 (315) 866-6040	Mohawk Data Sciences Palisade St. Herkimer, NY 13350 (315) 866-6040	Reo-Data Products 7346 Bolsa Ave. Westminster, CA 92683 (714) 892-3366
Model	2016 and 2017	2200 and 3200	Reo-80

Evaluation Guide Procedure VII-2.A NRC Identification No.

PERFORMANCE DATA

Print & Ink Mechanism	Impact Ribbon	Impact Ribbon	Impact Ribbon
Print Position	8 to 20 col. in 1-col. increments	10 to 22/32 col. in 1-col. increments	9 to 21 col. in 6-col. increments
Char. Set			
Numerics/Sym.	16 char. (2016)	16 char.	16 char.
Alphanumerics	48 char. (2017)	48 char.	42 char.
Printing Rate			
Numerics Only	20lps (400cps)	40lps (1280cps)	Information not available
Alphanumerics	10lps (200cps)	20lps (640cps)	1lps (21cps)
Spacing			
Columns/Inch (cm)	10 (3.9)	10 (3.9)	7 (2.7)
Lines/Inch (cm)	6 (2.4)	6 (2.4)	6 (2.4)
Operation	Asynch.	Synch. & asynch.	Synch.
Paper			
Roll	200ft (61m) long x 2¾in (7cm) wide	200ft (61m) long x 3¼in (8.3cm) wide	200ft (61m) long x 3in (7.6cm) wide
Fan-Fold			66 sheets 3in (7.6cm) long x 3in (7.6cm) wide
Controls	*Inputs:* Print; Line Advance; *Outputs:* Printer Lockout; Printer Ready; *Panel:* On/Off; Inhibit; Test; Paper Advance	*Inputs:* Print; Line Advance; *Outputs:* Printer Lockout; Printer Ready; *Panel:* On/Off; Inhibit; Paper Advance; Print Once	*Inputs:* Print; Col. Advance; Line Advance; *Outputs:* Printer Lockout; Printer Ready; Out-of-Paper; *Panel:* On/Off; Print; Space

PHYSICAL DATA

Environment			
Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	115/230V, 50/60Hz	115/230V, 50/60Hz	115/230V, 60Hz

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Model 2017 is numeric only

INSTALLATIONS

DATA LOGGING, DIGITAL AND LIST PRINTERS

Manufacturer	Systron-Donner Corp. 888 Galindo St. Concord, CA 94520 (415) 682-6161	Systron-Donner Corp. 888 Galindo St. Concord, CA 94520 (415) 682-6161	Veeder-Root 70 Sargeant St. Hartford, CT 06102 (203) 527-7201
Model	5103 and 5103A	5103B	Series 7703

Evaluation Guide Procedure VII-2.A NRC Identification No.

PERFORMANCE DATA

Print & Ink Mechanism	Impact ribbon	Impact ribbon	Impact ribbon
Print Position	5 to 21 col. in 5/6 col. increments	7 to 21 col. in 7-col. increments	13 to 21 col.
Char. Set			
Numerics/Sym.	16 char.	16 char.	16 char.
Alphanumerics	Information not available	Information not available	Information not available
Printing Rate			
Numerics Only	2.8lps (59cps)	2.8lps (59cps)	2.8lps (59cps)
Alphanumerics	Information not available	Information not available	Information not available
Spacing			
Columns/Inch (cm)	7 (2.7)	7 (2.7)	7¼ (2.8)
Lines/Inch (cm)	5 (2)	5 (2)	5 (2)
Operation	Asynch.	Asynch.	Asynch.
Paper			
Roll	20½ft (6.2m) long x 3½in (8.9cm) wide	20½ft (6.2m) long x 3½in (8.9cm) wide	147ft (45m) long x 3½in (8.9cm) wide
Fan-Fold	450 sheets 7in (17.8cm) long x 3½in (8.9cm) wide	450 sheets 7in (17.8cm) long x 3½in (8.9cm) wide	Information not available
Controls	*Inputs:* Print; Line Adv.; Color; *Outputs:* Printer Lockout; Printer Ready; Out-of-Paper; Inhibit; *Panel:* On/Off; Print	*Inputs:* Print; Line Adv.; Color; *Outputs:* Printer Lockout; Print; Paper Advance	Inputs: Print; Line Adv.; *Outputs:* Printer Lockout; *Panel:* On/Off; Print; Line Advance

PHYSICAL DATA

Environment			
Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	117/230V, 48 to 400Hz	115/230V, 48 to 440Hz	115V, 50/60Hz

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

OEM model

INSTALLATIONS

DATA LOGGING, DIGITAL AND LIST PRINTERS

Manufacturer	Vogue Instrument 131st Street at Jamaica Ave. Richmond Hill, NY 11418 (212) 641-8800
Model	800A
Evaluation Guide Procedure VII-2.A	NRC Identification No.

PERFORMANCE DATA

Print & Ink Mechanism	Impact, ink roller
Print Position	12 to 24 col.
Char. Set	
Numerics/Sym.	16 char.
Alphanumerics	Information not available
Printing Rate	
Numerics only	10lps (240cps)
Alphanumerics	Information not available
Spacing	
Columns/Inch (cm)	10 (3.9)
Lines/Inch (cm)	6 (2.4)
Operation	Asynch.
Paper	
Roll	3½in (8.9cm) wide
Fan-Fold	Information not available
Controls	Information not available

PHYSICAL DATA

Environment	
Characteristics	Information not obtained
Weight	Information not obtained
Size	Information not obtained
Power	115V, 60Hz

COST DATA

Price	Information not obtained

NOTES

INSTALLATIONS

KEYBOARD TELEPRINTERS

Printers are almost universally employed to create visual records of a display of information. Even though a number of types are readily available with wide ranges of capabilities, all printers are composed of four generic elements: print and ink mechanism, paper feed controls, printer operation controls, and interfacing elements. The use of printers in physical security systems is outlined in Volume VIII, Section 1 (Alarm Signalling Systems).

Many printers can interface with a wide range of devices (CRT displays, computers, magnetic tape transports), while others can only interface with a very limited number. Some printers have a keyboard that permits local entry of information and interchange of information with other interconnected devices, while others can only receive and print information derived from other sources. Among the wide choices of interfacing capabilities there is also the opportunity to select different printer information input/output data rates, print speeds, numbers of characters and fonts, numbers of characters per line, type of paper, paper feed, and so on.

In addition to the obvious distinguishing characteristic of keyboard teleprinters, they all have a keyboard, these devices have other features in common as well. They all permit local entry of information and interchange of information with other devices. Their other characteristics are similar to those for serial and receive-only printers in that they generally have modest printing speeds (most range between 10 and 30 characters per second), they print one character at a time, and they can print at least 80 characters per line. In other respects such as number of characters and fonts, type of paper, paper feed and print mechanisms, the keyboard teleprinters vary widely in capability.

By far the most widely used type of print mechanism is the impact type. However, with technical advances, and with the need to reduce the noise level in operating environments, more non-impact printers of various types are becoming available. Impact printers use a print medium that operates much like a conventional typewriter. An impression is transferred from a type slug on a ball, drum, chain or wheel to the paper. Ink is provided by a ribbon or a roller, or is incorporated in the paper itself. Some printers are equipped with dual color (red and black) ink ribbons to distinquish critical information. Multiple copies may be obtained, as with a typewriter. Another type of impact mechanism uses a solenoid-driven matrix of points instead of a type slug, forming a dot matrix character on the paper. Different sizes of dot matrices are provided with different machines. The 5 x 7 dot matrix is most common, but other matrices offering a higher degree of legibility are available: 7 x 7, 7 x 9, 5 x 9.

There are three varieties of non-impact print mechanisms: electrode, electro-optical and spray. In an electrolytic printer the electrodes form the image by the transfer of metal ions from the positively charged metal electrode to chemically-treated electrosensitive paper. The electrodes charge the surface of the paper, and the latent image formed by the charge attracts a toner which is developed by either heat or solvent to produce the character. In a thermal printer, the electrodes are resistive and are heated by current pulses to form the image on heat-sensitive paper. The second class of mechanisms uses electro-optics to flash an optical image on photosensitive paper, forming the character. The third class is the "video-jet" type that sprays controlled jets or drops of ink onto the page, generating a dot matrix that has very good legibility -- the dots are so close together that the character appears to be composed of straight lines. None of the non-impact-type printers makes copies or prints in two colors.

Ribbons for some impact printers are mounted on spools whose width is equal to the column width; the ribbon travels in the same direction as the paper. Other printers use a narrow (3/4 in/1.9 cm) ribbon that travels perpendicular to the paper motion, as in conventional typwriters. Only the latter type of ribbon drive is capable of two-color printing.

In the impact type of printers, the paper and the ribbon when used as the inking mechanism should not move during the print cycle. However, excessive dwell time, the time it takes the impact component to make contact between the paper and the ribbon, can cause the printed character to be smeared in the direction of paper travel. To reduce smearing, some printers use type slugs having character sets with thinner lines in the segments of the character that are perpendicular to the paper travel. Both the "smearing" and the specially designed characters tend to affect the legibility of the printed information.

Generally, either of two types of feed mechanism is employed: sprocket (including tractor-mounted pins) or friction. The sprocket/pin type requires edge-perforated paper. Some printers can use either perforated or unperforated paper in different widths, giving the user a wide choice. Since the sprocket/pin type provides more positive control of the paper, the higher-speed printers use that type of feed.

Some printers employing the non-impact type of mechanism, such as the electrostatic, electrolytic and thermal types, do not need to stop paper during the print cycles.

Associated with the paper feed are controls that advance the paper between print cycles. The timing and coordination between the printing action and paper movement are crucial to good legibility. Some printers can advance the paper at two different speeds; a slow speed for normal line-to-line stepping, and a higher speed for slewing when several lines are skipped. The skipping of lines (vertical formatting) can be controlled by operator action, by components incor-

porated within the printer or by control signals from an interconnected device. In addition to the controls for paper advance, other controls are incorporated such as end-of-paper (forms) stop, paper-jam stop, and ribbon-jam stop.

Printer controls fall into two broad categories: those that are internal, and those that are accessible to the operator. The former may be integrated with the printer mechanism or the paper control mechanism, or may have provision in the interfacing logic to accept control signals from interconnected devices. The controls accessible to the operator range from simple panel controls (OFF/ON, PRINT) to full keyboards augmented with special function keys. Many printers have both very complex local operator control features and sophisticated internal logic that accepts control signals from interconnected devices.

The interface logic couples the printer to external devices. These interfaces may include a teletype-compatible current loop, or may conform to the electrical and logic specifications of the Electronic Industry Association (EIA) RS-232 standards, or may provide Diode Transistor Logic/Transistor-Transistor Logic (DTL/TTL) signal levels. Some printers have built-in data sets or modems (modulator-demodulators) which convert the transmitted binary character code voltages into audible tones or frequencies that are acceptable to the communications lines and which convert the received tones or frequencies to the binary signal needed by the print mechanisms. Many printers have switch-selectable input/output characteristics, permitting a variety of data rates and electrical and logic interfaces. Synchronous or asynchronous data transmission and reception between the printers and interconnected devices can occur simultaneously (full-duplex mode) or, by switch selection, in one-way transfer at a time (half-duplex). Many printers operate in a receive only (RO) or simplex (interconnected device-to-printer only) mode.

The performance parameters of printers generally fall into one of two major interrelated areas: those that affect the legibility of the presented information, and those that are related to the particular operational mode(s) in which the printer is used. Both areas relv on comprehensive planned/programmed and fault correction maintenance activities.

The legibility performance is dependent on many factors, including the contrast between the printed characters and the background, the ambient illumination, the character size/spacing/font, the method of forming the characters and the printing speed. The type of paper used is a determinant of contrast; in general the sensitized papers provide less contrast than the non-sensitized. The amount of ambient illumination may or may not be a serious factor; some printers incorporate internal illumination of the printed paper. Of course, the contrast between black characters and the background is different than that of red characters. Measures of overall legibility are determined statistically.

The operational performance capability of printers also depends on the capability of the basic elements with certain factors having a greater impact than others. These include the paper width, the print mechanism (impact or non-impact), the availability of two-color printing to differentiate between alarm and non-alarm data, the number of printed characters/line (columns), the number of character types that can be printed, the accessibility of the printed paper for viewing of information as it is being printed or for annotation during operation if required and ambient lighting.

The amount of maintenance required primarily depends on the type of print and ink mechanism and the operating speed. Some non-impact printers require addition of liquids (toners, ink) or storage of sensitized paper in controlled environments such as refrigerators. Hence, all printers depend on scheduled maintenance. Faults or degradation in performance between scheduled maintenance periods usually are

detected visually, backed up by "trouble" light indications -- out-of-paper, out-of-ink, paper-jam, ribbon-jam, smearing, etc. The more sophisticated printers may have periodic internal or interconnected computer-generated off-line/on-line diagnostic checks.

Inasmuch as printers are manufactured for a wide range of users and applications, tamper switches are not incorporated therein. However, printers do incorporate provisions for reducing the effects of RFI and EMI since they normally operate in an environment with other equipments, i.e., computers, memory devices and CRT displays.

The more complex printers can be either purchased or leased; the simpler ones can only be purchased. Under lease arrangements maintenance is provided by the lessor, and the cost of maintenance may be included in the lease price or may be charged on a per visit/per hour basis. For purchased printers, maintenance may be provided by the seller on a per visit/per hour cost basis, or the purchaser may arrange for his own maintenance.

Purchase prices of the keyboard teleprinters range from about $775 to $7,000, with an average of about $3,000. Lease prices vary from about $30/month to $300/month, with an average price of about $90/month.

KEYBOARD TELEPRINTERS

Manufacturer	American Data Systems Canoga Park, CA	Anderson Jacobson 1065 Morse Ave. Sunnyvale, CA 94086 (408) 734-4030	Anderson Jacobson 1065 Morse Ave. Sunnyvale, CA 94086 (408) 734-4030
Model	715	AJ 230	AJ 330

Evaluation Guide Procedure VII-2.A NRC Identification No.

PERFORMANCE DATA

Print & Ink Mechanism	Impact	Impact wheel	Impact wheel
Char. Set	ASCII	64 char. — ASCII	64 char. — ASCII
Print Rate	Information not available	10cps	10cps
Feed Controls			
Char./Inch (cm)	Information not available	10 (3.9)	10 (3.9)
Lines/Inch (cm)	Information not available	6 and 3 (2.4 and 1.2)	6 and 3 (2.4 and 1.2)
Columns/Line	Information not available	72	72
Horiz. Space	Information not available	information not available	Information not available
Vert. Tab	Information not available	None	None
Vert. Space	Information not available	Information not available	Information not available
Auto Page Adv.	Information not available	Information not available	Information not available
Form Feed	Information not available	Information not available	Information not available
Horz. Tab	Information not available	None	None
Forms	Roll	3 part	3 part
Operational Features	Information not available	Information not available	Auto. Answer
Buffer Size	Information not available	Information not available	Information not available
Record & Edit Features	Information not available	Paper tape, character delete	Paper tape, character delete
Interfacing	Information not available	150 baud acoustic coup. 20mA loop	150 baud acoustic coup. 20mA loop
Compatability	Information not available	TTY 33 (see notes)	TTY 33 (see notes)

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Portable, use as typewriter — Correspondence & BCD codes — data coupler, cassette recorder, opt.	Uses Teletype 33 as teleprinter	Uses Teletype 33 as teleprinter

INSTALLATIONS

KEYBOARD TELEPRINTERS

Manufacturer	Anderson Jacobson 1065 Morse Ave. Sunnyvale, CA 94086 (408) 734-4030	Anderson Jacobson 1065 Morse Ave. Sunnyvale, CA 94086 (408) 734-4030	Barker Engineering (Div. of Hohfelder Co.) 26470 Lakewood Blvd. Cleveland, OH 44132 (216) 731-7400
Model	AJ 630	AJ 841	Dataprinter Series
Evaluation Guide Procedure VII-2.A	NRC Identification No.		

PERFORMANCE DATA

Print & Ink Mechanism	Non-impact thermal 5x8 dot matrix	Impact Selectric, ribbon	Impact wheel
Char. Set	128 char. — ASCII	EBCDIC	63 Char. ASCII/EAI BCD NC code
Print Rate	10/15/30cps (sw sel)	15 cps	10 to 10/15/30cps
Feed Controls			
Char./Inch (cm)	10 (3.9)	10/12 (3.9/4.7)	10 (3.9)
Lines/Inch (cm)	6 (2.4)	6 (2.4)	6 (2.4)
Columns/Line	140	132/156	72
Horiz. Space	90 positions/sec.	15 positions/sec.	Information not available
Vert. Tab	Information not available	Information not available	None
Vert. Space	Information not available	7½lps	Information not available
Auto. Page Adv.	Information not available	Information not available	Option
Form Feed	Information not available	Pin platen	Information not available
Horz. Tab	Standard	Information not available	None
Forms	1 part	6 part	8 part
Operational Features	Parity error detect, H&F duplex (sw sel), answerback (opt.)	Information not available	Information not available
Buffer Size	2 char.	2 char.	None
Record & Edit Features	Information not available	Cassette (opt.)	Paper tape Cassette (opt.)
Interfacing	RS232C. Integral modem or acoustic coupler (opt.)	RS232C. Integral modem, stand-alone coupler (opt.)	RS232C. 20mA loop
Compatability	Information not available	IBM 2741	TTY 33/35 ASR see notes

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	65lb (28kg)
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Uses Teletype 33 or 35 teleprinter

INSTALLATIONS

KEYBOARD TELEPRINTERS

Manufacturer	Comdata Corporation 7544 W. Oakon St. Niles, IL 60648 (312) 692-6107	Comdata Corporation 7544 W. Oakon St. Niles, IL 60648 (312) 692-6107	Comdata Corporation 7544 W. Oakon St. Niles, IL 60648 (312) 692-6107
Model	33-KFT-12001	33-AFM-32113	33-ASM-52113

Evaluation Guide Procedure VII-2.A NRC Identification No.

PERFORMANCE DATA

Printer & Ink Mechanism	Impact wheel	Impact wheel	Impact wheel
Char. Set	64 char. — ASCII	64 char. — ASCII	64 char. — ASCII
Print Rate	10 cps	10 cps	10 cps
Feed Controls			
Char./Inch (cm)	10/12 (3.9/4.7)	10/12 (3.9/4.7)	10.12 (3.9/4.7)
Lines/Inch (cm)	6 (2.4)	6 (2.4)	6 (2.4)
Columns/Line	74/88	74/88	74/88
Horiz. Space	Information not available	Information not available	Information not available
Vert. Tab	None	None	Option
Vert. Space	Information not available	Information not available	Information not available
Auto. Page Adv.	None	None	Standard
Form Feed	Information not available	Information not available	Pin feed & mobile std.
Horz. Tab	None	None	None
Forms	2 part	2 part	2 part
Operational Features	Information not available	Information not available	Information not available
Buffer Size	None	None	None
Record & Edit Features	None	Paper tape, character & line delete	Paper tape, character & line delete
Interfacing	RS232C. 20mA loop, integral modem or coup. CCITT & DTL/TTL (opt.)	RS232C. 20mA loop, integral modem or coup. CCITT & DTL/TTL (opt.)	RS232C. 20mA loop, integral modem or coup. CCITT & DTL/TTL (opt.)
Compatability	TTY 33 KSR (see notes)	TTY 33 ASR (see notes)	TTY 33 ASR (see notes)

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	40lb (18kg)	44lb (20kg)	44lb (20kg)
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Uses Teletype 33 as teleprinter	Uses Teletype 33 as teleprinter, mobile stand	Uses Teletype 33 as teleprinter

INSTALLATIONS

KEYBOARD TELEPRINTERS

Manufacturer	CAE Electronics Ltd. Montreal, P.Q. Canada	Compro 127 E. Dyer Rd. Santa Ana, CA 92707 (714) 540-7153	Compro 127 E. Dyer Rd. Santa Ana, CA 92707 (714) 540-7153
Model	100	Comproport 1030	Compro 5000
Evaluation Guide Procedure VII-2.A	NRC Identification No.		

PERFORMANCE DATA

Print & Ink Mechanism	Impact	Impact drum, ribbon	Impact Selectric, ribbon
Char. Set	ASCII	64 char. — ASCII	128 char. — ASCII
Print Rate	11 char./sec.	10/15/30 cps (sw sel)	14.8cps
Feed Controls			
Char./Inch (cm)	10.8 (4.2)	8 (3.1)	10/12 (3.9/4.7)
Lines/Inch (cm)	Information not available	6 (2.4)	6 (2.4)
Columns/Line	Information not available	80	132
Horiz. Space	Information not available	20 positions/sec	15 positions/sec
Vert. Tab	Information not available	Option	None
Vert. Space	Information not available	60lps	Information not available
Auto. Page Adv.	Information not available	Option	Option
Form Feed	Information not available	Information not available	Information not available
Horz. Tab	Information not available	Option	Standard
Forms	Roll, fan 5 ply	6 part	5 part
Operational Features	Information not available	Information not available	Information not available
Buffer Size	Information not available	None	200 to 2000 char.
Record & Edit Features	Information not available	Line/char. delete (opt.), cassette (opt.), paper tape (opt.)	Line edit/verify, line/char./delete, cassette (opt.)
Interfacing	Information not available	RS232C. Integral modem or coup. parallel, 20mA loop CCITT, DTL/TTL (opt.)	RS232C. Integral modem or coup. parallel, 20mA loop CCITT, DTL/TTL (opt.)
Compatability	Information not available	TTY ASRs	IBM 2741

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	26lb (11.7kg)	25lb (11.5kg)	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	100 to 250V, 45 to 60Hz	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Portable, adj. Auto. Answer, selective resp. Opt. Line Adv. = 100msec. Carr. Return = 300msec. Print Line Width = 7.5in (19cm)	Modem, numeric key pad (opt.)	600/1200bps modem, numeric key pad (opt)

INSTALLATIONS

KEYBOARD TELEPRINTERS

Manufacturer	Compro 127 E. Dyer Rd. Santa Ana, CA 92707 (714) 540-7153	Compudata 100 Manton Ave. Providence, RI 02909 (401) 351-3525	Computer Devices 9 Ray Ave. Burlington, MA 01803 (617) 273-1550
Model	Compro 6000	CD 3000	CDI 1030

Evaluation Guide Procedure VII-2.A NRC Identification No.

PERFORMANCE DATA

Print & Ink Mechanism	Impact belt ink roller	Impact wheel ink roller	Non-impact thermal 5x7 dot matrix
Char. Set	96 char. — ASCII/ EBCD/BCD/ECMA	64 char. — ASCII	96 char. — ASCII
Print Rate	10/15/30cps (sw sel)	10/15/30cps (sw sel)	10/15/30cps (sw sel)
Feed Controls			
Char./Inch (cm)	10/12 (3.9/4.7)	10 (3.9)	10 (3.9)
Lines/Inch (cm)	6 (2.4)	6 (2.4)	6 (2.4)
Columns/Line	132	132	80
Horiz. Space	20 positions/sec.	Information not available	30 positions/sec.
Vert Tab	Standard	Option	None
Vert. Space	25ips	Information not available	Information not available
Auto. Page Adv.	Standard	Option	None
Form Feed	Pin feed & split platen	Pin	Information not available
Horz. Tab	Standard	Option	None
Forms	6 part	6 part	1 part
Operational Features	Information not available	Parity error detect H&F duplex (sw sel)	Parity error detect, H&F duplex (sw sel), answerback (opt.)
Buffer Size	200 to 2000 char.	Option	None
Record & Edit Features	Line edit/verify, line/char. delete, cassette (opt.)	Cassette (opt.) paper tape (opt.)	Cassette (opt.) paper tape (opt.)
Interfacing	RS232C parallel CCITT, DTL/TTL, & modem or coupler (opt.)	RS232C. 20mA loop, acoustic coupler (opt.)	RS232C DTL/TTL. Integral modem or coupler, parallel (opt.)
Compatability	IBM 2741	TTY 35 ASR/KSR-IBM 2741	TTY 33 KSR

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	25lb (11.5kg)
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Numeric key pad (opt.)	110/150/300 baud coupler (opt).	110/150/300 baud, coupler, numeric key pad (opt.)

INSTALLATIONS

KEYBOARD TELEPRINTERS

Manufacturer	Computer Telewriter Systems 10705 W. 120th Ave. Broomfield, CO 80020 (303) 466-1985	Computer Transceiver Systems 317 Route 17 Paramus, NJ 07652 (201) 261-6800	Computer Transceiver Systems 317 Route 17 Paramus, NJ 07652 (201) 261-6800
Model	E1-41-G	Execuport 310	Execuport 1200
Evaluation Guide Procedure VII-2.A		NRC Identification No.	

PERFORMANCE DATA

Print & Ink Mechanism	Impact-type bar, ribbon	Non-impact thermal, 5x7 dot matrix	Impact
Char. Set	64 char. — ASCII	96 char. — ASCII	ASCII/EBCDIC
Print Rate	10cps	10/15/30cps (sw sel)	10/15/30/60/120cps
Feed Controls			
Char./Inch (cm)	12 (4.7)	10 (3.9)	Information not available
Lines/Inch (cm)	6/4½/3/2½/2ipi	6 (2.4)	Information not available
Columns/Line	100/132/168	80	132
Horiz. Space	10 positions/sec.	30 positions/sec.	Information not available
Vert. Tab	None	None	Information not available
Vert. Space	10lps	Information not available	Information not available
Auto. Page Adv.	None	None	Information not available
Form Feed	Information not available	Information not available	Pin
Horz. Tab	None	None	Information not available
Forms	10 part	1 part	6 part
Operational Features	Answerback, H&F duplex (sw sel)	H&F duplex (sw sel), answerback (opt.), polling/address (opt.)	Information not available
Buffer Size	12 char.	Option	132 char.
Record & Edit Features	Information not available	Line edit, char./line delete (opt.)	Information not available
Interfacing	RS232C, 20mA loop, & 60mA loop, DTL/TTL integral coupler, parallel (opt.)	RS232C, Parallel integral modem or coupler, 20mA loop, CCITT & DTL/TTL (opt.)	Information not available
Compatability	TTY ASR/KSR	TTY ASR/KSR	TTY ASR/KSR, IBM 2741

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	35lb (16kg)	28lb (12.5kg)	Information not obtained
Wize	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Operational Features:
Parity error detect (opt.)
Auto answer (opt.)

Numeric key pad (opt.)

INSTALLATIONS

KEYBOARD TELEPRINTERS

Manufacturer	Comstar Corp. 7413 Washington Ave. So. Edina, MN 55435 (612) 941-4454	Control Data 8100 34th Ave. So. Minneapolis, MN 55440 (612) 888-5555	CPT Corporation 7505 Highway 7 Minneapolis, MN 55426 (612) 935-0381
Model	Concept 30	712-92412, 92413	Input/Output Typewriter
Evaluation Guide Procedure VII-2.A		NRC Identification No.	

PERFORMANCE DATA

Print & Ink Mechanism	Impact wheel, ink roller	Impact wheel, ink roller	Impact Selectric, ribbon
Char. Set	64 char. — ASCII	64 char. – ASCII	128 char. — ASCII
Print Rate	30cps	30cps	15.4cps
Feed Controls			
Char./Inch (cm)	10 (3.9)	10 (3.9)	10/12 (3.9)(4.7)
Lines/inch (cm)	6 (2.4)	Information not available	6 (2.4)
Columns/Line	132	132	32
Horiz. Space	30 positions/sec.	Information not available	Information not available
Vert. Tab	Option	Information not available	Information not available
Vert. Space	96lps	Information not available	Information not available
Auto. Page Adv.	None	Information not available	Information not available
Form Feed	Pin	Information not available	Information not available
Horz. Tab	Option	Information not available	Information not available
Forms	6 part	6 part	6 part
Operational Features	Answerback, parity error detect, H&F duplex (sw sel)	Information not available	Information not available
Buffer Size	Information not available	256 char.	3 char.
Record & Edit Features	Cassette (opt.), paper tape (opt.)	Cassette (opt.)	Information not available
Interfacing	RS232C, 20mA loop, CCITT — DTL/TTL, parallel	RS232C parallel, integral modem	DTL/TTL
Compatability	TTY ASR/KSR	Information not available	Information not available

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Auto. answer (opt.) Numeric key pad

INSTALLATIONS

KEYBOARD TELEPRINTERS

Manufacturer	Daconics 925 Thompson Place Sunnyvale, CA 94086 (408) 732-2634	Data Access Systems 503 Route 10 Dover, NJ 07801 (201) 361-2345	Data Access Systems 503 Route 10 Dover, NJ 7801 (201) 361- 45
Model	2911	DAS 100	DAS 4125
Evaluation Guide Procedure VII-2.A		NRC Identification No.	

PERFORMANCE DATA

Print & Ink Mechanism	Impact Daisy disk (See note 1) ribbon	Impact drum ribbon	Non-impact thermal 5x7 dot matrix
Char. Set	96 char — ASCII	96 char — ASCII	96 char — ASCII
Print Rate	30 cps	10/15/30 cps (sw sel)	10/15/30 cps (sw sel)
Feed Controls			
Char./Inch (cm)	6 (2.4)	10 (3.9)	10 (3.9)
Lines/Inch (cm)	6 (2.4) (See note 2)	6 (2.4)	6(2.4)
Columns/Line	132	132	80
Horiz. Space	325 positions/sec (See note 2)	300 positions/sec	30 positions/sec
Vert. Tab	Up & down	Option	None
Vert. Space	Information not available	Information not available	30 lps
Auto. Page Adv.	Information not available	Option	None
Form Feed	Pin	Pin feed & split platen	Information not available
Horz. Tab	Standard	Standard	None
Forms	6 part	10 part	1 part
Operational Features	Parity error detect	H&F duplex (sw sel), auto answer (opt)	H&F duplex (sw sel), answerback (opt)
Buffer Size	None	30 char	200 char
Record & Edit Features	None	Char delete, cassette (opt), paper tape (opt)	Cassette, char delete, paper tape (opt)
Interfacing	DTL/TTL Parallel HP 2100A mini	RS232C parallel 20mA loop, CCITT & DTL/TTL (opt)	RS232C 20mA loop, integral modem or coupler CCITT & DTL/TTL (opt)
Compatibility	Information not available	TTY ASR/KSR	TTY ASR/KSR

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	25lb (11.5kg)	Information not obtained	21lb (9.4kg)
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

[1]Uses Diablo HyType-printer mechanism [2]48 positions/inch for graphics	Numeric key pad (opt)	Operational features: polling/address (opt), auto answer (opt), numeric key pad (opt)

INSTALLATIONS

KEYBOARD TELEPRINTERS

Manufacturer	Dat[illegible] Industries 1700 Halsted St. Chicago Hgts, IL 60411	Data Interface Assoc. P.O. Box 33 Brookfield Ctr, CT 06805 (203) 792-0290	Data Products 6219 De Sota Ave. Woodland Hills, CA 91364 (312) 887-8446
Model	13	DI-240 T	Portocom — PC-8110

Evaluation Guide Procedure VII-2.A NRC Identification No.

PERFORMANCE DATA

Print & Ink Mechanism	Impact-type bar, ribbon	Non-impact magnetic, 10x12 dot matrix	Impact drum, ribbon
Char. Set	96 char — ASCII	96 char — ASCII/ EBCD/3CD/Baudot	64 char — ASCII
Print Rate	10/15 cps	240 cps	10 cps
Feed Controls			
Char./Inch (cm)	Information not available	10 (3.9)	10.8 (4.2)
Lines/Inch (cm)	Information not available	6 (2.4)	6 (2.4)
Columns/Line	132	80	80
Horiz. Space	Information not available	Information not available	Information not available
Vert. Tab	Information not available	None	None
Vert. Space	Information not available	Information not available	Information not available
Auto. Page Adv.	Information not available	Option	None
Form Feed	Information not available	Pin	Pin
Horz. Tab	Standard	None	None
Forms	10 part	1 part	4 part
Operational Features	H&F duplex (opt)	H&F duplex (opt), answerback (opt), polling/address (opt)	Parity error detect, H&F duplex (sw sel), answerback (opt)
Buffer Size	Information not available	128 char	None
Record & Edit Feature	Information not available	Line edit, line delete, cassette (opt), paper tape (opt)	Cassette paper tape (opt)
Interfacing	DTL/TTL RS232C (opt)	RS232C Parallel, 20mA loop (opt)	RS232C Parallel DTL/TTL, integral modem or coupler
Compatibility	Information not available	TTY ASR	TTY ASR

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	37lb (16.5kg)	30lb (13.5kg)
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

	Operational features: Parity error detect, auto answer (opt), stand-alone keyboard, numeric key pad (opt)	Numeric key pad

INSTALLATIONS

KEYBOARD TELEPRINTERS

Manufacturer	Data Terminals P.O. Box 5583 San Jose, CA 95150 (408) 378-1112	Datron Industries, Inc. Greensburg, PA	DI/AN Controls 944 Dorchester Ave. Boston, MA 02125 (617) 288-7700
Model	1900	T/S-5	KSR-9030
Evaluation Guide Procedure VII-2.A	NRC Identification No.		

PERFORMANCE DATA

Print & Ink Mechanism	Impact wheel, ribbon	Impact	Impact 7x9 dot matrix, ribbon
Char. Set	64 char	Information not available	128 char — ASCII
Print Rate	10 cps	10 char	10/15/30 cps (sw sel)
Feed Controls			
Char./Inch (cm)	10 (3.9)	Information not available	10 (3.9)
Lines/Inch (cm)	6 (2.4)	Information not available	6 (2.4)
Columns/Line	72/96	Information not available	80/132
Horiz. Space	10 positions/sec	Information not available	30 positions/sec
Vert. Tab	Option	Information not available	Option
Vert. Space	66 lps	Information not available	30 lps
Auto. Page Adv.	None	Information not available	Standard
Form Feed	Pin (opt)	Information not available	Information not available
Horz. Tab	None	Information not available	Option
Forms	5 part	Roll	6 part
Operational Features	Answerback, H&F duplex (sw sel), auto answer (opt)	Information not available	Parity error detect, H&F duplex (sw sel), answerback (opt)
Buffer Size	None	Information not available	None
Record & Edit Features	Paper tape	Information not available	Char delete, cassette (opt), paper tape (opt)
Interfacing	RS232C 20mA loop, stand-alone acoustic coupler, integral modem (opt)	Information not available	RS232C, DTL/TTL
Compatibility	TTY ASR	Information not available	TTY KSR

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	90lb (40kg)	48lb (22kg)	40lb (18kg)
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	115V, 60Hz	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

	Print line width = 7.2in (18cm)	Operational features: polling/address (opt), auto answer (opt)

INSTALLATIONS

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KEYBOARD TELEPRINTERS

Manufacturer	Digital Equipment 146 Main St. Maynard, MA 01754 (617) 897-5111	Facit-Odhner 501 Winsor Drive Secaucus, NJ 07094 (201) 866-5111	GE/Communications Systems Division P.O. Box 4197 Lynchburg, VA 24502 (703) 846-7311
Model	DECWriter LA-30	I/O Facit 3851	TermiNet 300

Evaluation Guide Procedure VII-2.A NRC Identification No.

PERFORMANCE DATA

Print & Ink Mechanism	Impact 5x7 dot matrix, ribbon	Impact-type bar, ribbon	Impact belt, ribbon
Char. Set	64 char — ASCII	92 char — ASCII/ECMA	96 char — ASCII
Print Rate	30 cps	15 cps	10/15/30 cps (sw sel)
Feed Controls			
Char./Inch (cm)	10 (3.9)	8 to 16 (3.1 to 6.3 cm)	10 (3.9)
Lines/Inch (cm)	6 (2.4)	6 (2.4)	6 (2.4)
Columns/Line	80	134 to 308	75/80/118
Horiz. Space	30 positions/sec	107 positions/sec	30 positions/sec
Vert. Tab	None	Option	Option
Vert. Space	30 lps	15 lps	Information not available
Auto. Page Adv.	None	None	Option
Form Feed	Pin	Pin	Pin
Horz. Tab	None	Standard	Option
Forms	2 part	14 part	6 part
Operational Features	Parity error detect (opt)	Parity error detect, H&F duplex (opt), answerback (opt)	H&F duplex (sw sel), answerback (opt), polling/address (opt)
Buffer Size	None	Option	Information not available
Record & Edit Features	Information not available	Cassette (opt), paper tape (opt)	Line edit, char/line, delete, cassette (opt), paper tape (opt)
Interfacing	DTL/TTL parallel RS232C, 20mA loop & CCITT (opt)	RS232C 20mA loop, CCITT & DTL/TTL, parallel	RS232C Parallel (opt), integral modem (opt), stand-alone coupler (opt)
Compatibility	TTY KSR	TTY KSR-IBM 2740/2741	TTY ASR/KSR

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	110lb (50kg)	58lb (26kg)	70lb (33kg)
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

	Polling/address (opt), auto answer (opt)	Parity error detect (opt), auto answer (opt)

INSTALLATIONS

KEYBOARD TELEPRINTERS

Manufacturer	GE/Communications Systems Division P.O. Box 4197 Lynchburg, VA 24502 (703) 846-7311	Gulton Industries Hawthorne, CA	IBM 1133 Westchester Ave. White Plains, NY 10604 (914) 696-1900
Model	TermiNet 1200	Ten/Thirty	1052
Evaluation Guide Procedure VII-2.A	NRC Identification No.		

PERFORMANCE DATA

Print & Ink Mechanism	Impact belt, ribbon	Impact	Impact selectric, ribbon
Char. Set	96 char — ASCII	Information not available	Information not available
Print Rate	10/30/120 cps (sw sel)	10, 15 or 30 char/sec (selectable)	14.8 cps
Feed Controls			
Char./Inch (cm)	10 (3.9)	Information not available	10/12 (3.9/4.7)
Lines/Inch (cm)	6 (2.4)	Information not available	6/8 (2.4/3.1)
Columns/Line	80/120	Information not available	130/125
Horiz. Space	120 positions/sec	Information not available	Information not available
Vert. Tab	Option	Information not available	Option
Vert. Space	Information not available	Information not available	Information not available
Auto. Page Adv.	Option	Information not available	Information not available
Form Feed	Pin	Information not available	Pin (opt)
Horz. Tab	Option	Information not available	Standard
Forms	7 part	Roll, fan 6 ply	6 part
Operational Features	H&F duplex (sw sel), answerback (opt), polling/address (opt)	Information not available	Information not available
Buffer Size	Information not available	Information not available	None
Record & Edit Features	Line edit, char/line, delete, cassette (opt), paper tape (opt)	Information not available	None
Interfacing	RS232C Parallel (opt), integral modem (opt) stand-alone coupler (opt)	Information not available	IBM S/360 Models 22 thru 195; IBM S/370 Models 155 thru 195
Compatibility	TTY ASR/KSR	Information not available	Information not available

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	70lb (33kg)	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	120V, 60Hz	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Parity error detect (opt), auto answer (opt), numeric key pad (opt), 30/60/120 cps (opt)

Line Adv = 30 msec
Carr = 385 msec
Print line width = 13.2in (33.5cm)

INSTALLATIONS

KEYBOARD TELEPRINTERS

Manufacturer	IBM 1133 Westchester Ave White Plains, NY 10604 (914) 696-1900	IBM 1133 Westchester Ave. White Plains, NY 10604 (914) 696-1900	IBM 1133 Westchester Ave. White Plains, NY 10604 (914) 696-1900
Model	1816	2152	2740 and 2741

Evaluation Guide Procedure VII-2.A NRC Identification No.

PERFORMANCE DATA

Print & Ink Mechanism	Impact Selectric, ribbon	Impact Selectric, ribbon	Impact Selectric, ribbon
Char. Set	Information not available	88 char — EBCDIC	EBCDIC/BCD
Print Rate	14.8 cps	15.5 cps	14.8 cps
Feed Controls			
Char./Inch (cm)	10/12 (3.9/4.7)	10 (3.9)	10/12 (3.9/4.7)
Lines/Inch (cm)	6/8 (2.4/3.1)	6/8 (2.4/3.1)	6/8 (2.4/3.1)
Columns/Line	130/125	125	130/125
Horiz. Space	Information not available	Information not available	Information not available
Vert. Tab	Information not available	Information not available	Information not available
Vert. Space	Information not available	Information not available	Information not available
Auto. Page Adv.	Information not available	Information not available	Information not available
Form Feed	Pin (opt)	Information not available	Pin feed & split platen
Horz. Tab	Standard	Standard	Standard
Forms	6 part	5 part	5 part
Operational Features	Information not available	Information not available	Half duplex, polling/address (opt)
Buffer Size	None	None	120 to 440 char
Record & Edit Features	None	None	Char/line delete (opt), line edit (opt)
Interfacing	IBM 1800	IBM S/360 Model 20	IBM S/360 Models 22 thru 195 IBM S/370 Models 135 thru 195 — RS232C
Compatibility	Information not available	Information not available	Information not available

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

INSTALLATIONS

KEYBOARD TELEPRINTERS

Manufacturer	International Teleprinter Corp. Carlstadt, NJ 07072 (201) 438-1770	I/O Devices 9 Skyline Drive Montville, NJ 07045 (201) 335-2935	ITT/Data Equipment & Systems Division E. Union Ave. E. Rutherford, NJ 07073 (201) 935-3900
Model	Series 30	100	3010 Envoy ASR
Evaluation Guide Procedure VII-2.A	NRC Identification No.		

PERFORMANCE DATA

Print & Ink Mechanism	Impact 5x7 or 7x9 dot matrix	Impact wheel, ribbon	Impact cylinder, ribbon
Char. Set	128 char — ASCII/BCD/ECMA/Baudot	96 char — ASCII	96 char — ASCII
Print Rate	30cps	35 to 50cps (sw sel)	10cps
Feed Controls			
Char./Inch (cm)	10 (3.9)	10/12 (3.9/4.7)	10/12 (3.9/4.7)
Lines/Inch (cm)	6 (2.4)	6/12 (2.4/4.7)	6 (2.4)
Columns/Line	80/132	132/260	72/85
Horiz. Space	30 positions/sec.	350 positions/sec.	Information not available
Vert. Tab	Option	Option	Standard
Vert. Space	30lps	20lps	Information not available
Auto. Page Adv.	Option	Standard	Information not available
Form Feed	Pin	Pin feed & split platen	Pin
Horz. Tab	None	Standard	Standard
Forms	6 part	7 part	Information not available
Operational Features	H&F duplex (sw sel), Answerback (opt), polling/address (opt)	H&F duplex (sw sel), Answerback (opt), polling/address (opt)	Answerback, parity error detect, H&F duplex (opt)
Buffer Size	None	32 to 512 char	None
Record & Edit Features	Cassette (opt), paper tape (opt)	None	Paper tape
Interfacing	RS232C. 20/60mA loop (opt) CCITT (opt), DTL/TTL (opt), integral modem (opt)	20mA Loop, DTL/TTL, parallel RS232C (opt), integral modem	RS232C CCITT
Compatibility	TTY ASR/KSR	TTY ASR/KSR	TTY ASR

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	150lb (67kg)	130lb (58kg)
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Parity error detect (opt), auto answer (opt), numeric key pad (opt)	Parity error detect (opt), auto answer (opt), numeric key pad (opt), F&H line spacing	Numeric key pad (opt)

INSTALLATIONS

KEYBOARD TELEPRINTERS

Manufacturer	Marsland Engineering Ltd. 350 Weber North Waterloo Ontario, Canada (519) 744-3321	Marsland Engineering Ltd. 350 Weber North Waterloo Ontario, Canada (519) 744-3321	Memorex 1180 Shulman Ave Santa Clara, CA 95050 (408) 247-1000
Model	2	3	1240

Evaluation Guide Procedure VII-2.A NRC Identification No.

PERFORMANCE DATA

Print & Ink Mechanism	Impact wheel, ribbon	Impact wheel, ribbon	Impact cartridge, ribbon
Char. Set	CCITT	ASCII	96 char — ASCII
Print Rate	6.6cps	10cps	10/15/30/60cps
Feed Controls			
Char./Inch (cm)	10 (3.9)	10 (3.9)	10 (3.9)
Lines/Inch (cm)	6/3 (2.4/1.2)	6/3 (2.4/1.2)	6 (2.4)
Columns/Line	72	72	132
Horiz. Space	Information not available	Information not available	Information not available
Vert. Tab	None	None	Option
Vert. Space	Information not available	Information not available	15lps
Auto. Page Adv.	None	None	Option
Form Feed	Information not available	Information not available	Pin
Horz. Tab	None	None	Option
Forms	6 part	6 part	6 part
Operational Features	Answerback, polling/addressing (opt)	Answerback, polling/addressing (opt)	H&F duplex (sw sel), parity error detect (opt)
Buffer Size	None	None	Information not available
Record & Edit Features	Paper tape (opt)	Paper tape (opt)	Information not available
Interfacing	20mA loop integral modem or acoustic coupler (opt)	20mA loop, integral modem or acoustic coupler (opt)	RS232C Parallel (opt), integral modem or acoustic coupler (opt)
Compatibility	TTY ASR/KSR	TTY ASR/KSR	IBM 2741

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	56lb (25kg)	56lb (25kg)	150lb (67kg)
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

INSTALLATIONS

KEYBOARD TELEPRINTERS

Manufacturer	Memorex 1180 Shulman Ave. Santa Clara, CA 95050 (408) 247-1000	Memorex 1180 Shulman Ave. Santa Clara, CA 95050 (408) 247-1000	Memorex 1180 Shulman Ave. Santa Clara, CA 95050 (408) 247-1000
Model	1241	1242	1280

Evaluation Guide Procedure VII-2.A NRC Identification No.

PERFORMANCE DATA

Print & Ink Mechaaism	Impact cartridge, ribbon	Impact cartridge, ribbon	Impact cartridge, ribbon
Char. Set	94 char — ASCII	94 char — ASCII	94 char — ASCII
Print Rate	30/60cps	30/60cps	10/15/30/60cps
Feed Controls			
Char./Inch (cm)	10 (3.9)	10 (3.9)	10 (3.9)
Lines/Inch (cm)	6 (2.4)	6 (2.4)	6 (2.4)
Columns/Line	120	120	120
Horiz. Space	Information not available	Information not available	Information not available
Vert. Tab	Option	Option	Option
Vert. Space	15lps	15lps	15lps
Auto. Page Adv.	Option	Option	Option
Form Feed	Pin	Pin	Pin
Horz. Tab	Option	Option	Option
Forms	6 part	6 part	6 part
Operational Features	Auto answer, polling/addressing, parity error detect (opt)	Auto answer, polling/addressing, parity error detect	H&F duplex (sw sel), auto answer (opt) parity error detect (opt)
Buffer Size	Information not available	256 to 512 char	Information not available
Record & Edit Features	Information not available	Char/Line Delete (opt) Line Edit (opt)	Char/Line Delete Line Edit — Cassette
Interfacing	RS232C, integral coupler integral modem (opt)	RS232C, integral coupler integral modem (opt)	RS232C, integral modem or acoustic coupler
Compatibility	IBM 2740-1	IBM 2740-2	Information not available

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	150lb (67kg)	150lb (67kg)	155lb (70kg)
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Numeric key pad (opt)	Numeric key pad (opt)	Numeric key pad (opt)

INSTALLATIONS

KEYBOARD TELEPRINTERS

Manufacturer	MITE Data Equipment 446 Blake St. New Haven, CT 06515 (203) 387-2572	MITE Data Equipment 446 Blake St. New Haven, CT 06515 (203) 387-2572	NCR 3131 So. Dixie Hwy. Dayton, OH 45439 (513) 449-3970
Model	123 T — Portable	123 and 150 KSR	260 KSR

Evaluation Guide Procedure VII-2.A NRC Identification No.

PERFORMANCE DATA

Print & Ink Mechanism	Impact cylinder, ribbon	Impact cylinder, ribbon	Non-impact thermal, 5x7 dot matrix
Char. Set	64 char — ASCII/Baudot	64 char — ASCII/Baudot	96 char — ASCII
Print Rate	10/15cps (sw sel)	10/15cps (sw sel)	30cps
Feed Controls			
Char./Inch (cm)	10.8/10 (4.2/3.9)	10.8/10 (4.2/3.9)	10 (3.9)
Lines/Inch (cm)	6 (2.4)	6 (2.4)	6 (2.4)
Columns/Line	80/75	80/75	80
Horiz. Space	Information not available	15 positions/sec	Information not available
Vert. Tab	None	None	None
Vert. Space	Information not available	9lps	Information not available
Auto. Page Adv.	None	None	None
Form Feed	Pin	Pin	Information not available
Horz. Tab	None	None	None
Forms	6 part	6 part	1 part
Operational Features	H&F duplex (sw sel), parity error detect, answerback (opt)	H&F duplex (sw sel), parity error detect, answerback (opt)	Information not available
Buffer Size	None	None	None
Record & Edit Features	Cassette (opt)	Cassette (opt), paper tape (opt), line edit (opt), char line delete	Information not available
Interfacing	DTL/TTL, parallel integral modem or coupler, 20mA loop, RS232 & CCITT (opt)	20mA loop (DTL/TTL) parallel RS232C & CCITT (opt)	RS232C, DTL/TTL
Compatibility	TTY KSR	TTY KSR	TTY KSR

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	30lb (13.5kg)	55lb (25kg)	13lb (5.8kg)
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Operational features: polling/addressing (opt), auto answer (opt)

INSTALLATIONS

KEYBOARD TELEPRINTERS

Manufacturer	Novar 2370 Charleston Road Mountain View, CA 94040 (415) 964-3900	Novar 2370 Charleston Road Mountain View, CA 94040 (415) 964-3900	Novar 2370 Charleston Road Mountain View, CA 94040 (415) 964-3900
Model	5-41	5-50	5-60

Evaluation Guide Procedure VII-2.A NRC Identification No.

PERFORMANCE DATA

Print & Ink Mechanism	Impact Selectric, ribbon	Impact Selectric, ribbon	Impact Selectric, ribbon
Char. Set	96 char — EBCD/BCD	96 char — EBCD/BCD	96 char — ASCII
Print Rate	15cps	15cps	15cps
Feed Controls			
Char./Inch (cm)	10 (3.9)	10/12 (3.9/4.7)	10/12 (3.9/4.7)
Lines/Inch (cm)	6 (2.4)	6 (2.4)	6 (2.4)
Columns/Line	130	130	130
Horiz. Space	Information not available	Information not available	Information not available
Vert. Tab	None	None	None
Vert. Space	Information not available	Information not available	Information not available
Auto. Page Adv.	None	None	None
Form Feed	Information not available	Information not available	Information not available
Horz. Tab	Standard	Standard	Standard
Forms	Information not available	Information not available	Information not available
Operational Features	Parity error detect, auto answer (opt)	Parity error detect, address (opt) auto ans (opt)	Parity error detect, auto answer (opt)
Buffer Size	2 char	350 char	350 char
Record & Edit Features	Information not available	Cartridge mag tape, char/line delete	Cartridge mag tape, char/line delete
Interfacing	RS232B. Integral modem	RS232C. Integral modem CCITT (opt), acoustic coupler (opt)	RS232C. CCITT, integral modem, acoustic coupler (opt)
Compatibility	IBM 2741	IBM 2740	Information not available

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	65lb (29kg)	71lb (32kg)	71lb (32kg)
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Numeric key pad (opt)	Numeric key pad (opt)	Numeric key pad (opt)

INSTALLATIONS

KEYBOARD TELEPRINTERS

Manufacturer	Olivetti America One Park Ave. New York, NY 10016 (212) 371-5500	Olivetti America One Park Ave. New York, NY 10016 (212) 371-5500	Olivetti America One Park Ave. New York, NY 10016 (212) 371-5500
Model	TE 308 SH	TE 315	TE 318
Evaluation Guide Procedure VII-2.A	NRC Identification No.		

PERFORMANCE DATA

Print & Ink Mechanism	Impact wheel, ribbon	Impact wheel, ribbon	Impact wheel, ribbon
Char. Set	64/96 char — ASCII	64/96 char — ASCII	64/96 char — ASCII
Print Rate	10cps	6.6/10/13.3cps	10cps
Feed Controls			
Char./Inch (cm)	10 (3.9)	10 (3.9)	10 (3.9)
Lines/Inch (cm)	6 (2.4)	6 (2.4)	6 (2.4)
Columns/Line	80	80	80
Horiz. Space	Information not available	Information not available	Information not available
Vert. Tab	None	None	Information not available
Vert. Space	Information not available	Information not available	Information not available
Auto. Page Adv.	Option	Option	Option
Form Feed	Pin	Pin	Pin
Horz. Tab	Information not available	None	Information not available
Forms	6 part	6 part	6 part
Operational Features	Answerback, auto answer, H&F duplex (sw sel)	Answerback, auto ans, H&F duplex (sw sel), polling/addressing (opt)	Answerback, auto ans, H&F duplex (sw sel) polling/addressing (opt)
Buffer Size	Information not available	10 char	1 char
Record & Edit Features	Paper tape, char/line delete	Char/line delete, paper tape (opt)	Char/line delete, paper tape (opt)
Interfacing	RS232C. CCITT	20mA loop, CCITT	RS232C. CCITT, 20mA loop DTL/TTL (opt) parallel (opt)
Compatibility	TTY ASR/KSR	TTY ASR/KSR	TTY ASR

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	165lb (74kg)	165lb (74kg)	145lb (66kg)
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Operational features: polling/addressing (opt), parity error detect (opt), numeric key pad (opt)	Numeric key pad (opt)	Numeric key pad (opt)

INSTALLATIONS

KEYBOARD TELEPRINTERS

Manufacturer	Olivetti America One Park Ave. New York, NY 10016 (212) 371-5500	Olivetti America One Park Ave. New York, NY 10016 (212) 371-5500	Olivetti America One Park Ave. New York, NY 10016 (212) 371-5500
Model	TE 319	TE 338	TE 339

Evaluation Guide Procedure VII-2.A NRC Identification No.

PERFORMANCE DATA

Print & Ink Mechanism	Impact wheel, ribbon	Impact wheel, ribbon	Impact wheel, ribbon
Char. Set	64 char — ASCII	64/96 char — ASCII	64 char — ASCII/BCD
Print Rate	15cps	10cps	15cps
Feed Controls			
Char./Inch (cm)	10 (3.9)	10 (3.9)	10 (3.9)
Lines/Inch (cm)	6 (2.4)	6 (2.4)	6 (2.4)
Columns/Line	80	120	120
Horiz. Space	Information not available	100 positions/sec.	150 positions/sec.
Vert. Tab	Information not available	Information not available	Information not available
Vert. Space	Information not available	Information not available	Information not available
Auto. Page Adv.	Option	Option	Option
Form Feed	Pin	Pin	Pin
Horz. Tab	Information not available	Standard	Standard
Forms	6-part	6-part	6-part
Operational Features	Answerback, auto. ans., H&F duplex (sw sel), polling/addressing (opt.)	Answerback, auto. ans., H&F duplex (sw sel), polling/addressing (opt.)	Answerback, auto. ans., H&F duplex (sw sel), polling/addressing (opt.)
Buffer Size	Information not available	Information not available	Information not available
Record & Edit Features	Char/line delete, paper tape (opt)	Char/line delete, paper tape (opt)	Char/line delete, paper tape (opt)
Interfacing	RS232C. CCITT 20mA loop, Parallel (opt)	RS232C. CCITT 20mA loop,	RS232C. CCITT parallel
Compatibility	TTY ASR/KSR	TTY ASR/KSR	TTY ASR/KSR

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	175lb (78kg)	165lb (74kg)	167lb (75kg)
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Numeric key pad (opt)	Parity error detect (opt), numeric key pad (opt)	Numeric key pad (opt)

INSTALLATIONS

KEYBOARD TELEPRINTERS

Manufacturer	Repco 1940 Lockwood Way P.O. Box 7065 Orlando, FL 32804 (305) 843-8484	Sanders Data Systems Daniel Webster Hwy. So. Nashua, NH 03060 (603) 885-6660	SCM Ind. Prod. Dept. Palo Alto, CA
Model	120 KSR/ASR	Buffered Hard Copy Communications Terminal	TMP-250
Evaluation Guide Procedure VII-2.A	NRC Identification No.		

PERFORMANCE DATA

Print & Ink Mechanism	Non-impact electro-static, 5x7 dot matrix	Impact Selectric, ribbon	Impact, 2-color ribbon
Char. Set	64 char. — ASCII	ASCII/EBCD	Information not available
Print Rate	120cps	15cps	10cps
Feed Controls			
Char./Inch (cm)	10 (3.9)	10/12 (3.9/4.7)	10/12 (3.9/4.7)
Lines/Inch (cm)	5/6 (2.0/2.4)	6 (2.4)	Information not available
Columns/Line	80	53 & 102 (See note 1) or 156	Information not available
Horiz. Space	Information not available	Information not available	Information not available
Vert. Tab	None	Information not available	Information not available
Vert. Space	Information not available	Information not available	Information not available
Auto. Page Adv.	Information not available	Information not available	Information not available
Form Feed	Information not available	Information not available	Information not available
Horz. Tab	None	Information not available	Information not available
Forms	1 part	Information not available	Roll, forms
Operational Features	Answerback (opt), parity error detect (opt), polling/addressing (opt)	Polling/addressing, half duplex	Information not available
Buffer Size	128 to 256 char	1,024 char (See note 2)	Information not available
Record & Edit Features	Line edit, char/line, Delete, cassette (opt), paper tape (opt)	Line edit, char/line delete	Information not available
Interfacing	RS232C, TTL	1,200 baud modem	Information not available
Compatibility	TTY ASR/KSR	IBM 2741/2740	Information not available

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	25lb (11.5kg)	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	117V, 60Hz

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Auto. answer (opt), H&F duplex (opt)	[1]Dual platen [2]Intelligent terminal	Line Adv = 100 msec. Carr Ret. = 687 msec. Print Line Width = 11in (28cm) Char. Height 0.1in (0.25cm)

INSTALLATIONS

725 290

KEYBOARD TELEPRINTERS

Manufacturer	Standard Elektrik Lorenz A.G. (ITT) Stuttgart, Germany	Standard Elektrik Lorenz A.G. (ITT) Stuttgart, Germany	SCM (Kleinschmidt Div.) Deerfield, IL 60015 (312) 945-1000
Model	L 0133	L 0380	311
Evaluation Guide Procedure VII-2.A	NRC Identification No.		

PERFORMANCE DATA

Print & Ink Mechanism	Impact	Impact	Impact drum, ribbon
Char. Set	Information not available	Information not available	64 char — ASCII/BCD/ Baudot
Print Rate	13 char (368,400,600 char/min)	22 char/sec	37.2cps
Feed Controls			
Char./Inch (cm)	Information not available	Information not available	10 (3.9)
Lines/Inch (cm)	Information not available	Information not available	6 (2.4)
Columns/Line	Information not available	Information not available	72/80
Horiz. Space	Information not available	Information not available	25 positions/sec
Vert. Tab	Information not available	Information not available	Option
Vert. Space	Information not available	Information not available	25lps
Auto. Page Adv.	Information not available	Information not available	Option
Form Feed	Information not available	Information not available	Pin
Horz. Tab	Information not available	Information not available	Option
Forms	Roll	Roll	6 part
Operational Features	Information not available	Information not available	Parity error detect (opt), H&F duplex (opt)
Buffer Size	Information not available	Information not available	None
Record & Edit Features	Information not available	Information not available	Char delete
Interfacing	Information not available	Information not available	Mil 188C, RS232C, CCITT, 20mA loop, DTL/ TTL, parallel (opt)
Compatibility	Information not available	Information not available	TTY ASR/KSR

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	110/240V, 50/60Hz	110/240V, 50/60Hz	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Answerback Option	Tape Punch, Reader Opt.
Line adv. = 75 msec.	Char/line = 69, 72
Carr. ret. = 130 msec.	Line adv. = 50 msec.
Print line width = 7.1in (18cm)	Carr. ret. = 250 msec.
Char. height 0.1in (0.25cm)	Print line width = 8.2in

INSTALLATIONS

1725292

KEYBOARD TELEPRINTERS

Manufacturer	SCM (Kleinschmidt Div.) Deerfield, IL 60015 (312) 945-1000	Siemens America 186 Wood Ave., So. Nashua, NH 03060	Snyder-Data 133 Brimbal Ave. Beverly, MA 01915 (617) 627-3222
Model	321 ADS	Teleprinter 100	Total Term

Evaluation Guide Procedure VII-2.A NRC Identification No.

PERFORMANCE DATA

Print & Ink Mechanism	Impact drum, ribbon	Impact-type bar, ribbon	Impact wheel, ink roller
Char. Set	64 char ASCII/BCD/Baudot	64 char — ASCII	64 char — ASCII
Print Rate	37.2cps	12cps	30cps
Feed Controls			
Char./Inch (cm)	10 (3.9)	10 (3.9)	10 (3.9)
Lines/Inch (cm)	6 (2.4)	4/6 (1.6/2.4)	6 (2.4)
Columns/Line	72/80	69/72/104	132
Horiz. Space	25 positions/sec.	Information not available	Information not available
Vert. Tab	Option	Option	Option
Vert. Space	25lps	Information not available	Information not available
Auto. Page Adv.	Option	None	Standard
Form Feed	Pin	Pin	Pin
Horz. Tab	Option	Option	Option
Forms	6 part	10 part	6 part
Operational Features	Parity error detect (opt), H&F duplex (opt)	Answerback auto answer, H&F duplex (opt)	Answerback, parity error detect, auto answer
Buffer Size	None	None	5 to 132 char
Record & Edit Features	Char delete, paper tape	Char delete, paper tape (opt)	Paper tape (opt)
Interfacing	Mil 188C RS232C, CCITT, 20mA loop, DTL/TTL, parallel (opt)	20mA loop, CCITT, parallel (opt)	RS232C Parallel
Compatibility	TTY ASR/KSR	TTY ASR/KSR	TTY ASR/KSR

PHYSICAL DATA

Environment Characteristics	Information not obtained	information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Numeric key pad (opt)
H&F duplex (opt)

INSTALLATIONS

KEYBOARD TELEPRINTERS

Manufacturer	Teletype 5555 Touhy Ave. Skokie, IL 60076 (312) 982-2500	Teletype 5555 Touhy Ave. Skokie, IL 60076 (312) 982-2500	Teletype 5555 Touhy Ave. Skokie, IL 60076 (312) 982-2500
Model	33	35	37

Evaluation Guide Procedure VII-2.a NRC Identification No.

PERFORMANCE DATA

Print & Ink Mechanism	Impact wheel, ribbon	Impact wheel, ribbon	Impact wheel, ribbon
Char. Set	64 char — ASCII	64 char — ASCII	94/110/126 char — ASCII
Print Rate	10cps	10cps	15cps
Feed Controls			
Char./Inch (cm)	10 (3.9)	10 (3.9)	10/12 (3.9/4.7)
Lines/Inch (cm)	6/3 (2.4/1.2)	6 (2.4)	6 (2.4)
Columns/Line	72	72	72/82/132
Horiz. Space	Information not available	30 positions/sec.	45 positions/sec.
Vert. Tab	None	Option	Option
Vert. Space	Information not available	60lps	45lps
Auto. Page Adv.	Standard	Option	Option
Form Feed	Pin	Pin	Pin
Horz. Tab	None	Option	Option
Forms	3 part	6 part	6 part
Operational Features	Answerback, auto answer, H&F duplex (sw sel)	Answerback (opt), polling/Addressing (opt), parity error detect (opt)	Parity error detect, answerback (opt), polling/addressing (opt)
Buffer Size	None	None	None
Record & Edit Features	Paper tape, char delete, mag. tape cart. (opt)	Paper tape (opt), mag. tape cartridge (opt)	Paper tape (opt), mag. tape cartridge (opt)
Interfacing	20mA loop, integral modem, RS232C (opt)	20mA loop, RS232C (opt) integral modem (opt)	RS232C
Compatibility	Information not available	Information not available	Information not available

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	56lb (25kg)	136 to 225lb (61 to 100kg)	340lb (153kg)
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

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COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Operational Features: Polling/addressing (opt), parity error detect (opt), numeric key pad (opt)	Auto answer (opt), H&F duplex (opt)	Auto answer (opt), H&F duplex (opt), numeric key pad (opt)

INSTALLATIONS

KEYBOARD TELEPRINTERS

Manufacturer	Teletype 5555 Touhy Ave. Skokie, IL 60076 (312) 982-2500	Terminal Equipment 750 Hamburg Tpke. Pompton, NJ 07442 (201) 839-3000	Texas Instruments Digital/Systems Div. 12203 Southwest Freeway Stafford, TX 77577 (713) 494-5115
Model	38	Tycom 35 and 37	700 ASR (See notes)

Evaluation Guide Procedure VII-2.A NRC Identification No.

PERFORMANCE DATA

Print & Ink Mechanism	Impact wheel, ribbon	Impact Selectric, ribbon	Non-impact thermal, 5x7 dot matrix
Char. Set	128 char — ASCII	88 char — ASCII	128 char — ASCII/Baudot
Print Rate	10cps	10 to 15cs (sw sel)	30cps
Feed Controls			
Char./inch (cm)	10 (3.9)	10 (3.9)	10 (3.9)
Lines/Inch (cm)	6/3 (2.4/1.2)	6 (2.4)	6/3 (2.4/1.2)
Columns/Line	132	132	80
Horiz. Space	Information not available	15 positions/sec	Information not available
Vert. Tab	None	None	None
Vert. Space	Information not available	Information not available	30lps
Auto. Page Adv.	Standard	None	None
Form Feed	Pin	Pin	Information not available
Horz. Tab	None	Standard	None
Forms	3 part	10 part	1 part
Operational Features	Answerback, parity error detect, auto answer	Parity error detect H&F duplex (sw sel), answerback (opt)	Parity error detect answerback
Buffer Size	None	16 to 256 char	information not available
Record & Edit Features	Paper tape char. delete, mag. tape cartridge (opt)	Char. delete, cassette (opt), paper tape (opt)	Line edit, char/line delete, dual cassettes
Interfacing	RS232C. 20mA loop, integral modem	RS232C. 20mA loop, Integral modem or coupler	RS232C. 20mA loop, 300 or 1200 baud modem
Compatibility	Information not available	TTY ASR/KSR	Information not available

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	85lb (38.3kg)	Information not obtained	38lb (17.5kg) (KSR) 55lb (25kg) (ASR)
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

H&F duplex (sw sel), polling/addressing (opt) numeric key pad (opt)	Polling/addressing (opt), auto answer (opt), Selectric typewriter w/Tycom electronics	250cps cassette dup. KSR (non-cassette model is available)

INSTALLATIONS

KEYBOARD TELEPRINTERS

Manufacturer	Texas Instruments Digital Sys. Div. 12203 Southwest Freeway Stafford, TX 77577 (713) 494-5115	Texas Instruments Digital Sys. Div. 12203 Southwest Freeway Stafford, TX 77577 (713) 494-5115	Trendata Computer Sys. 585 No. Pastoria Ave. Sunnyvale, CA 94086 (408) 732-1790
Model	720 and 730	725 Portable	T Series

Evaluation Guide Procedure VII-2.A NRC Identification No.

PERFORMANCE DATA

Print & Ink Mechanism	Non-impact thermal, 5x7 dot matrix	Non-impact thermal, 5x7 dot matrix	Impact Selectric, ribbon
Char. Set	128 char. — ASCII	128 char. — ASCII	88 char. — EBCD
Print Rate	10/15/30cps (sw sel)	10/15/30cps (sw sel)	15.4cps
Feed Controls			
Char./Inch (cm)	10 (3.9)	10 (3.9)	10/12 (3.9/4.7)
Lines/Inch (cm)	6 (2.4)	6 (2.4)	6 (2.4)
Columns/Line	80	80	130/155
Horiz Space	Information not available	Information not available	15. positions/sec.
Vert. Tab	None	None	Option
Vert. Space	30lps	30lps	7.7lps
Auto. Page Adv.	None	None	None
Form Feed	Information not available	Information not available	Pin
Horz. Tab	None	None	Standard
Forms	1 part	1 part	7 part
Operational Features	H&F duplex (sw sel), answerback (opt.)	H&F duplex (sw sel), answerback (opt.)	Parity error detect, H&F duplex (sw sel), answerback (opt.)
Buffer Size	None	None	3 char.
Record & Edit Features	None	None	Cassette Line Edit Char/Line delete
Interfacing	RS232C, 20mA loop, parallel, integral modem (opt.)	Parallel, integral acoustic coupler, RS232C (opt.)	RS232C, DTL/TTL, parallel, integral modem or coupler, CCITT (opt.)
Compatibility	TTY KSR	TTY KSR	IBM 2740/2741

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	32 to 38lb (14 to 17kg)	35lb (16kg)	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

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COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Polling/addressing (opt.), auto. answer (opt.)

INSTALLATIONS

KEYBOARD TELEPRINTERS

Manufacturer	TTS 2928 Nebraska Ave. Santa Monica, CA 90404 (213) 478-4288	Typagraph 7547 Convoy Court San Diego, CA 92111 (714) 279-3690	United Data Serv., Inc. 4747 No. 16th St. Phoenix, AZ 85016
Model	TTS 110 AM	DP-30	UDS 311
Evaluation Guide Procedure VII-2.A	NRC Identification No.		

PERFORMANCE DATA

Print & Ink Mechanism	Impact, ribbon	Impact wheel, ribbon	Impact wheel, ribbon
Char. Set	64 char. — ASCII	94 char. — ASCII	64 char. — ASCII
Print Rate	10cps	10/15/30cps (sw sel)	10cps
Feed Controls			
Char./Inch (cm)	10/12/14/16/18 (3.9/4.7/5.5/6.3/7.1)	10 (3.9)	10/12 (3.9/4.7)
Lines/Inch (cm)	6 (2.4)	6 (2.4)	6 (2.4)
Columns/Line	72/90/96/105/132	132	72/86
Horiz. Space	Information not available	Information not available	10 positions/sec.
Vert. Tab	None	Information not available	None
Vert. Space	Information not available	Information not available	Information not available
Auto. Page Adv.	Option	Option	Option
Form Feed	Pin	Pin	Pin
Horz. Tab	None	Information not available	None
Forms	Information not available	6 part	3 part
Operational Features	Answerback, parity error detect, H&F duplex (sw sel)	Information not available	Answerback, H&F duplex (sw sel), polling/addressing (opt.)
Buffer Size	None	132 char.	None
Record & Edit Features	Paper tape, char. delete	Information not available	Paper tape
Interfacing	20mA loop, integral modem or coupler, RS232C (opt.)	Information not available	20mA loop, RS232C (opt.), integral modem or acoustic coupler (opt.)
Compatibility	TTY ASR/KSR	Information not available	TTY ASR/KSR

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	55lb (25kg)
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Polling/addressing (opt.), auto. answer (opt.), numeric key pad (opt.)	Numeric key pad (opt.),	Operational features: auto. answer (opt.), numeric key pad (opt.)

INSTALLATIONS

KEYBOARD TELEPRINTERS

Manufacturer	University Computing Co. Communications Systems P.O. Box 6228 Dallas, TX 75222 (214) 637-5010	University Computing Co. Communications Systems P.O. Box 6228 Dallas, TX 75222 (214) 637-5010	University Computing Co. Communications Systems P.O. Box 6228 Dallas, TX 75222 (214) 637-5010
Model	UCC 1030	UCC 1035	UCC 1040
Evaluation Guide Procedure VII-2.A		NRC Identification No.	

PERFORMANCE DATA

Print & Ink Mechanism	Impact Selectric, ribbon	Impact Selectric, ribbon	Impact Selectric, ribbon
Char. Set	96 char. — BCD/EBCD	100 char. — BCD/EBCD	100 char. — BCD/EBCD
Print Rate	15cps	15cps	15cps
Feed Controls			
Char./Inch (cm)	10/12 (3.9/4.7)	10/12 (3.9/4.7)	10/12 (3.9/4.7)
Lines/Inch (cm)	6/8 (2.4/3.1)	6/8 (2.4/3.1)	6/8 (2.4/3.1)
Columns/Line	130/156	130/156	130/156
Horiz. Space	100 positions/sec.	100 positions/sec.	100 positions/sec.
Vert. Tab	None	None	None
Vert. Space	7½lps	7½lps	7½lps
Auto. Page Adv.	None	None	None
Form Feed	Pin (opt.)	Pin (opt.)	Pin (opt.)
Horz. Tab	Standard	Standard	Standard
Forms	5 part	5 part	5 part
Operational Features	Parity error detect, answerback (opt.)	Parity error detect, answerback (opt.)	Parity error, answerback (opt.), polling/address. (opt.)
Buffer Size	3 char.	4 char.	4 char.
Record & Edit Features	None	Char/line delete, cassette	None
Interfacing	RS232C. 20mA loop (opt.), integral modem or acoustic coupler (opt.)	RS232C. 20mA loop (opt.), integral modem or acoustic coupler (opt.)	RS232C. 20mA loop (opt.), integral modem or acoustic coupler (opt.)
Compatibility	IBM 2741	IBM 2741	IBM 2741

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	58lb (26kg)	58lb (26kg)	58lb (26kg)
Size	Information not obtained	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained	Information not obtained

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COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Operational features:
H&F duplex (opt.)

INSTALLATIONS

KEYBOARD TELEPRINTERS

Manufacturer	Vernitron Corp. Data Devices Division Farmingdale, NY 11735	Wang Laboratories 836 No. St. Tewksbury, MA 01876 (617) 851-7311	Western Union Data Services 16 McKee Drive Mahwah, NJ 07430 (201) 529-4600
Model	VDT-3	1200 Cassette Typewriter	EDT 33

Evaluation Guide Procedure VII-2.A NRC Identification No.

PERFORMANCE DATA

Print & Ink Mechanism	Impact	Impact Selectric, ribbon	Impact wheel ribbon
Char. Set	Information not available	Correspondence	64 char. — ASCII
Print Rate	10 char/sec	15cps	10cps
Feed Controls			
Char./Inch (cm)	Information not available	10/12 (3.9/4.7)	10 (3.9)
Lines/Inch (cm)	Information not available	6 (2.4)	6/3 (2.4/1.2)
Columns/Line	Information not available	132/156	72
Horiz. Space	Information not available	Information not available	Information not available
Vert. Tab	Information not available	Information not available	None
Vert. Space	Information not available	Information not available	Information not available
Auto. Page Adv.	Information not available	Standard	Standard
Form Feed	Information not available	Information not available	Information not available
Horz. Tab	Information not available	Standard	None
Forms	Roll	6 part	3 part
Operational Features	Information not available	Parity error detect	Answerback, parity error detect, H&F duplex (sw sel)
Buffer Size	Information not available	256 char.	None
Record & Edit Features	Information not available	Char/line delete, line/message edit, single or dual cassette	paper tape
Interfacing	Information not available	RS232C	RS232C. Integral modem or coupler, parallel (opt.)
Compatibility	Information not available	IBM 2741	TTY ASR/KSR

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained	Information not obtained
Power	115V, 60Hz	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained	Information not obtained

NOTES

Acoustic coupler std. casters, hood for silent op. auto. ans. (opt.) print line width = 8in (20.3cm)	Automatic typing system w/telecommunications electronics option	Uses Teletype 33 as teleprinter

INSTALLATIONS

KEYBOARD TELEPRINTERS

Manufacturer	Western Union Data Services 16 McKee Drive Mahwah, NJ 07430 (201) 5290-4600	Western Union Data Services 16 McKee Drive Mahwah, NJ 07430 (201) 5290-4600
Model	EDT 35	EDT 300[1]

Evaluation Guide Procedure V II-2.A NRC Identification No.

PERFORMANCE DATA

Print & Ink Mechanism	Impact wheel, ribbon	Impact belt[1], ribbon
Char. Set	64 char. — ASCII	96 char. — ASCII
Print Rate	10cps	10/15/30cps (sw sel)
Feed Controls		
Char./Inch (cm)	10 (3.9)	10 (3.9)
Lines/Inch (cm)	6 (2.4)	6/3 (2.4/1.2)
Columns/Line	72	75/80/118
Horiz. Space	30 positions/sec	30 positions/sec
Vert. Tab	Option	Option
Vert. Space	60ips	Information not available
Auto. Page Adv.	Option	Option
Form Feed	Information not available	Information not available
Horz. Tab	Option	Option
Forms	6 part	6 part
Operational Features	Answerback, auto. answer, H&F duplex (sw sel)	Answerback, parity error detect, H&F duplex (sw sel)
Buffer Size	None	Information not available
Record & Edit Features	Paper tape	Paper tape
Interfacing	RS232C. Integral modem or coupler, parallel (opt.)	RS232C. Integral modem or coupler, parallel (opt.)
Compatibility	TTY ASR/KSR	TTY ASR/KSR

PHYSICAL DATA

Environment Characteristics	Information not obtained	Information not obtained
Weight	Information not obtained	Information not obtained
Size	Information not obtained	Information not obtained
Power	Information not obtained	Information not obtained

COST DATA

Price	Information not obtained	Information not obtained

NOTES

Uses Teletype 35 as teleprinter	Operational features: polling/address (opt.) autc. answer (opt.) 1. Uses GE TermiNet 300 as teleprinter

INSTALLATIONS

EVENT DISPLAYS AND RECORDERS

Event recorders usually use a transilluminated display in combination with a printer to indicate and record a change or an occurrence detected by a sensor or transducer. The transilluminated display may involve a series of indicator lights, either conventional incandescent, light-emitting diodes (LEDs), or a series of "flags". The flags may be "shutters" over incandescent bulbs. The printer is usually of the data logging or digital family, using impact printing with either a ribbon or roller ink mechanism (see Volume VII, Section 2.b).

The major functional elements of event recorders include the receiver, scanner, display, printer, and interface logic. Some devices have separable elements which include a remote transmitter at one location that sends received indications over long distances via telephone lines to the display and recording elements of the event recorder at a remote location.

Event recorders are often interconnected to each sensor or transducer, or to a zone covered by such devices, through a separate line. For certain event recorders this is a conventional 600-ohm telephone line, while other event recorders can only be interconnected by direct hardwire lines. Event recorders that utilize telephone lines have digital-to-analog and analog-to-digital (D/A/D) converters, sometimes used in conjunction with a modem, incorporated in the receiver element. Recorders that depend on hardwire interconnections have simple receivers that sense a change of state (voltage) of the line. The incoming signals from the D/A/D usually are placed in a memory, and the scanner element repeatedly scans the memory for signals. When the scanner detects the presence of a signal, appropriate messages are sent to the display and to the printer. In recorders that are hardwired to the sensors, the scanner examines each line, and when a change of state is noted, proper messages are sent to the display and the printer.

Most event recorders provide for modular growth through the addition of printed circuit (PC) boards or expander units. Some event recorders can accept signals from as many as 1000 sensor zones.

Two primary performance areas determine the suitability of an event recorder for a particular application: (1) the legibility of the display and of the printed information; and (2) the response time of the display and printer to stimuli at the sensor or transducer. Legibility is affected by the size, spacing, and font of the legends on the display and the printed information, the positioning of the legends with respect to the indicators (bulbs, LEDS, or flags), the ambient illumination color of indicators, and the resultant contrast. In general the legibility of displayed or printed characters is within acceptable limits of MIL-STD-1472B (Human Engineering Design Criteria), since most devices provide characters at least one-eighth inch in height, properly spaced and positioned. The colors of lights may be critical if the display is operated in high ambient light, for example in bright sunlight, since under such conditions red is not readily apparent and green and blue lights are hard to distinguish from each other.

Response time is a critical parameter in some installations and is a function of scanner speed, memory size, number of zones, and printer response time. Typical event recorders have an overall response time of about one second per line per stimulus. However, some have response times approaching 30 seconds per line per stimulus, and these would be unsatisfactory in particular applications. Since many event recorders have long signal lines to the sensors, other provisions for line monitoring or physical hardening should be provided to maintain security and reduce vulnerability to tampering.

The event recorders generally incorporate maintenance aids, such as indicator light tests (manually or automatically tested), faulty power indicators, and end of paper/ink warnings in the printer element.

EVENT DISPLAYS AND RECORDERS

Manufacturer	Keltron Corp. 225 Crescent St. Waltham, MA 02154
Model	DM-700 Series, DM-600 Series, DM-900 Series
Reference Evaluation Guide Procedure No. VII-3.A	NRC Identification No.

NARRATIVE DESCRIPTION

The Keltron DM-700 and DM-600 Alarm Monitor Systems provide a high-speed digital printer as well as LED indicators and displays. When an alarm is received, the scanner stops and displays the corresponding zone number on the light readout, lights the "alarm" or "trouble" indicator (color coded) and sounds an audible alarm. The entire system is scanned in a fraction of a second, the alarms remembered, and a summary printed out for a permanent record.

PERFORMANCE DATA

Legibility:	0.1in (2.5mm) high characters.
Indicator Visibility:	Requires normal ambient lighting.
Response Time of Display:	350ms per line.
Display Mechanism:	High-speed digital printer and LED indicators.
Capacity:	The DM-700 has up to 1,000 locations. The DM-600 has up to 100 locations. DM-900 has 1,024 alarm points.
Illumination Requirements:	Normal room lighting.
Display Controls:	Controls acknowledge a condition, summarize alarms, disable a zone with telephone trouble, fast-scans on the display zones that are in alarm or trouble, and set a clock.
Resistance to Spoofing and Tampering:	Has option for tamperproofing.
Temperature:	32 to 120F (0 to 50C).
Humidity:	Information not available.
Other Environemntal Characteristics:	Information not available.
Interface:	A resistance change or a voltage polarity reversal with indicate an alarm condition.

PHYSICAL DATA

Size:	Alarm Unit: 19x8¾x14in (48x22x35cm); Equipment cabinet: 22x84x24in (56x215x61cm) for DM-700; Equipment cabinet: 24x30x8in (61x76x20cm) for DM-600.
Weight:	About 40lb (18kg) per unit.
Power (Primary/Secondary):	117V ac or 12V dc; approximately 100VA.
Emplacement:	Information not available.

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SUPPLY/LOGISTICS DATA

Documentation and Training:	Manuals are supplied. Training is not required.
Parts and Repairs:	Return to factory for repair.
Reliability:	MTBF not available.
Maintainability:	MTTR not available.
Warranty Information:	One year, parts and labor.
Government or Professional Standards:	UL Standard.
Lead Time:	4 weeks.

COST DATA

Unit Acquisition Cost:	$3,400 plus $26 per input for DM-600; $4,200 plus $26 per input for DM-700; $2,600 plus $6 per input for DM-900.
Unit Installation Cost:	None.
Training Cost:	None.
Maintenance Cost:	Paper cost about $2 per roll.
Operation Cost:	Information not available.

NOTES

INSTALLATIONS

EVENT DISPLAYS AND RECORDERS

Manufacturer	Protection Products, Inc. 10961 Bloomfield St. Los Alamitos, CA 90720 (213) 598-9474
Model	CSR 1000
Reference Evaluation Guide Procedure No. VII-3.A	NRC Identification No.

NARRATIVE DESCRIPTION

The CSR 1000 is a digital communicator using normal telephone lines to connect it to a digital transmitter. Digital tones are sent over the line. A provision for an operator to listen to sounds emanating from the protected premises is provided. An inked printer is built into the equipment. The unit will monitor 1000 alarms generated at any distance from the display.

PERFORMANCE DATA

Legibility:	Approximately 3/16in (0.5cm) high characters.
Indicator Visibility:	Requires normal ambient light.
Response time of Display:	Approximately 30 sec per line.
Display Mechanism:	Inked paper printer.
Capacity:	1,000 alarms.
Display Controls:	Clock setting; print advance; acknowledge; disconnect; auto-manual; operator alert.
Resistance to Spoofing and Tampering:	None.
Temperature:	32 to 120F (0 to 50C).
Humidity:	Information not available.
Other Environmental Characteristics:	Information not available.
Interface:	Normal telephone lines.

PHYSICAL DATA

Size:	8x18x18in (20x45x45cm).
Weight:	40lb (18kg).
Power (Primary/Secondary):	115V ac or 12V dc.
Emplacement:	Information not available.

SUPPLY/LOGISTICS DATA

Documentation and Training:	Manuals are supplied. Training is not required.
Parts and Repairs:	Return to factory for repair.
Reliability:	MTBF not available.
Maintainability:	MTTR not available.
Warranty Information:	One year, parts and labor.
Government or Professional Standards:	None.
Lead Time:	Off-the-shelf.

COST DATA

Unit Acquisition Cost:	$945.
Unit Installation Cost:	They prefer to sell to an installer.
Training Cost:	None.
Maintenance Cost:	Paper and ink.
Operation Cost:	Information not available.

NOTES

INSTALLATIONS

EVENT DISPLAYS AND RECORDERS

Manufacturer	Protection Products, Inc. 10961 Bloomfield St. Los Alamitos, CA 90720 (213) 598-9474
Model	CSR-176, CSR-100 and CSR-48

Reference Evaluation Guide Procedure No. VII-3.A NRC Identification No.

NARRATIVE DESCRIPTION

The CSR-176, -100, and -48 will monitor up to 176, 100 and 48 alarms respectively over dedicated phone lines using the polarity reversal method for distances as great as 30 miles (48km). Memory circuit stores and recalls alarms. Multiple alarms are simultaneously displayed over 176 red lights for the CSR-176, 48 red lights for the CSR-48, and a digital readout for the CSR-100.

PERFORMANCE DATA

Legibility:	Red lights on CSR-176 and CSR-48; ¾in (1.9cm) digital readout on CSR-100.
Indicator Visibility:	Ambient light.
Response Time of Display:	Less than one second.
Display Mechanism:	176 red lights on CSR-176; 48 red lights on CSR-48. The CSR-100 has a ¾in (1.9cm) digital readout.
Capacity:	176 alarms for CSR-176, 100 alarms for CSR-100, and 48 alarms for CSR-48.
Illumination Requirements:	Normal room light.
Display Controls:	Reset and audible alarm silencer.
Resistance to Spoofing and Tampering:	None.
Temperature:	32 to 120F (0 to 50C).
Humidity:	Information not available.
Other Environmental Characteristics:	Information not available.
Interface:	CSR-176 has reverse polarity; CSR-100 has digital McCulloh type of coding; and CSR-48 has switch closure.

PHYSICAL DATA

Size:	19in (48cm) wide; CSR-100 is 7in (18cm) high; CSR-176 is 5¼in (13.5cm) high, and CSR-48 is 3/5in (1.5cm) high.
Weight:	About 40lb (18kg).
Power (PrimarySecondary):	115V ac or 12V dc.
Emplacement:	Information not available.

SUPPLY/LOGISTICS DATA

Documentation and Training:	Manuals are supplied. Training is not required.
Parts and Repairs:	Return to factory for repair.
Reliability:	MTBF not available.
Maintainability:	MTTR not available.
Warranty Information:	One year, parts and labor.
Government or Professional Standards:	None.
Lead Time:	Off-the-shelf.

COST DATA

Unit Acquisition Cost:	CSR-176, $1,095; CSR-100 price not known; CSR-48, $325.
Unit Installation Cost:	Nil.
Training Cost:	None.
Maintenance Cost:	None.
Operation Cost:	Information not available.

NOTES

INSTALLATIONS

EVENT DISPLAYS AND RECORDERS

Manufacturer	Silent Knight Security Systems, Inc. 2930 Emerson Ave. So. Minneapolis, MN 55408 (612) 827-2681
Model	850 and 802 Printer
Reference Evaluation Guide Procedure No. VII-3.A	NRC Identification No.

NARRATIVE DESCRIPTION

The receiver is a compact desk-top unit that accepts and processes all calls from up to as many as 999 digital dialers. The receiver is connected to a telephone line and automatically answers incoming calls and transmits an "acknowledge" signal back to the dialer causing the dialer to transmit its identification and alarm code. Two consecutive identical code groups will cause the receiver to transmit a hang-up signal and terminate transmission. If the 850 is busy and does not answer, the dialer will hang up and call again (trying 21 times). The 802 Printer automatically records all information received by the 850. It provides a hard copy printout of the data, time alarm, account number and emergency code. It is connected to the receiver by a cable.

PERFORMANCE DATA

Legibility:	3/16in (0.5cm) letters on the Printer; the display has 1in (2.5cm) characters.
Indicator Visibility:	Depends upon ambient light for the printer.
Response Time of Display:	Information not available.
Display Mechanism:	Inked rollers on paper for printer.
Capacity:	999 zones.
Illumination Requirements:	Normal room lighting.
Display Controls:	Information not available.
Resistance to Spoofing and Tampering:	None built in.
Temperature:	68F (20C).
Humidity:	Information not available.
Other Environmental Characteristics:	Information not available.
Interface:	Telephone lines.

PHYSICAL DATA

Size:	850 Receiver: 7x10½x8¼in (18x27x21cm); 802 Printer: 7x6⅞x13¼in (18x17.5x34cm).
Weight:	850 Receiver 13lb (5.8kg); 802 Printer: 22lb (10kg).
Power (Primary/Secondary):	Receiver, 117V ac, 75OmA (inactive), 2.5A (active), Provisions for 12V dc standby power; Printer, 117V ac, 250mA (inactive), 2A (active), Provisions for 12V dc standby power.
Emplacement:	Desk top unit.

SUPPLY/LOGISTICS DATA

Documentation and Training:	Documentation is supplied with units. Training is not required.
Parts and Repairs:	Return to factory for repair.
Reliability:	MTBF not available.
Maintainability:	MTTR not available.
Warranty Information:	One year, parts and labor.
Government or Professional Standards:	None.
Lead Time:	Two weeks.

COST DATA

Unit Acquisition Cost:	Receiver and printer cost $1,100.
Unit Installation Cost:	The cost of the telephone line.
Training Cost:	None.
Maintenance Cost:	Paper cost is $2 per roll.
Operation Cost:	Information not available.

NOTES

INSTALLATIONS

EVENT DISPLAYS AND RECORDERS

Manufacturer Wells Fargo Alarm Services
(Gov't Systems Grp.)
1004 Sixth St., NW
Washington, DC 20001
(202) 237-5300

Model ER-1 and ER-2

Reference Evaluation Guide Procedure No. VII-3.A NRC Identification No.

NARRATIVE DESCRIPTION

The ER-1 Event Recorder consists of a pressure-sensitive paper printer, a common function panel, up to 12 memory zone banks, a power supply and associated circuitry. The ER-2 is an expander unit to increase the capacity of the ER-1, which can record up to 240 zones of data. The ER-2 expands this to 599 zones. The unit records the time of day, day of year, a code letter for type of alarm, zone number, memeory reset and paper advance.

PERFORMANCE DATA

Legibility: ⅛in (0.3cm) letters.
Indicator Visibility: Depends upon ambient light.
Response Time of Display: 2 lines/sec.; 999 messages can be read out — memory limited.
Display Mechanism: Eleven print wheels in conjunction with pressure sensitive paper.
Capacity: 240 zones with the ER-1. 599 zones with the ER-1 and ER-2 together.
Illumination Requirements: Normal room lighting.
Display Controls: Paper advance. A "low" paper indicator is provided.
Resistance to Spoofing and Tampering: Access to paper is behind locked door.
Temperature: 32 to 120F (0 to 50C).
Humidity: Information not available.
Other Environmental Characteristics: Information not available.
Interface: Switch closure.

PHYSICAL DATA

Size: 18.75x18.35x8.72in (47x46x22cm).
Weight: ER-1, 40lb (18kg); ER-2, 15lb (6.8kg).
Power (Primary/Secondary): 120V, 60Hz, 50W; has 6V standby battery.
Emplacement: Information not available.

SUPPLY/LOGISTICS DATA

Documentation and Training: Manuals are supplied for installation and repair. Training is not required.
Parts and Repairs: Available from Wells Fargo.
Reliability: MTBF is 15,000 hrs.
Maintainability: MTTR not available.
Warranty Information: One year, parts and labor.
Government or Professional Standards: UL Intrusion Device Standards are design criteria.
Lead Time: Information not available.

COST DATA

Unit Acquisition Cost: ER-1, $6,108; ER-2, $2,255; 20 zone ZM-1, $514; 20 zone EC-4 cable, $70.
Unit Installation Cost: 4 hours labor.
Training Cost: Nil.
Maintenance Cost: Paper cost is $105 for 24 roll case.
Operation Cost: Information not available.

NOTES

INSTALLATIONS

EVENT DISPLAYS AND RECORDERS

Manufacturer	Moore Systems, Inc. 121 Bordeaus Drive Sunnyvale, CA 94086 (408) 734-4020
Model	AL Systems Console

Reference Evaluation Guide Procedure No. VII-3.A NRC Identification No

NARRATIVE DESCRIPTION

The standard AL remote terminal, operating over a single-tone channel, can monitor up to 3,200 alarm inputs. A single master can monitor an unlimited number of remote locations. The AL system is ideally suited for microwave communication applications but can monitor any function that can be represented by a two-state sensor. In typical applications, remote terminals monitor the status of multiple sensors. The status reports are converted to coded tone signals which are sent over the communication network using standard tone channels. Any message signal is received at one or more master terminals where it is compared with the previous report. When a change occurs, an audible alarm is activated, and display panel indicators light to report the status change to the operator.

PERFORMANCE DATA

Legibility:	Standard RO 33 teletype.
Indicator Visibility:	Ambient light required.
Response Time of Display:	Information not available.
Display Mechanism:	RO 33 teletype.
Capacity:	3,200 points per system.
Illumination Requirements:	Ambient lighting.
Display Controls:	System Test, Audible Alarm Disable, Flasher Reset, Audible Alarm Reset, Acknowledge.
Resistance to Spoofing and Tampering:	None.
Temperature:	−25 to +150F (−30 to +65C).
Humidity:	Up to 95 percent.
Other Environmental Characteristics:	Altitude to 15,000ft (4.6km).
Interface:	The alarm inputs are switch closure or CMOS compatible inputs. Between transmitters and receiver, a frequency-shifted tone is used.

PHYSICAL DATA

Size:	Each unit, 19x12x1¾in (48x30x4.5cm).
Weight:	Average is less than 10lb (4.5kg).
Power (Primary/Secondary):	220V ac; 115V ac, 48V dc; 24V dc. Battery backup can be supplied. For a 24V dc, 32 point remote station, the current is less than 0.3A.
Emplacement:	Rack-mounted.

SUPPLY/LOGISTICS DATA

Documentation and Training:	Manuals are supplied. Training is minimal, less than 1 hour.
Parts and Repairs:	Return to factory.
Reliability:	MTBF not available.
Maintainability:	MTTR not available.
Warranty Information:	One year, parts and labor, if sent to factory.
Government or Professional Standards:	Made to good commercial and industrial standards.
Lead Time:	90 to 120 days per system, due to customizing.

COST DATA

Unit Acquisition Cost:	Information not available, due to customizing of installation.
Unit Installation Cost:	Information not available.
Training Cost:	Nil.
Maintenance Cost:	Information not available.
Operation Cost:	Information not available.

NOTES

INSTALLATIONS

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TRANSILLUMINATED DISPLAYS

Transilluminated displays employ backlighting on clear, translucent or fluorescent material, or use single and multiple legend/indicator lights or light-emitting diodes (LEDs) to present information upon receipt of signals. Such displays depend on other devices or elements (sensors, transducers, or signal processing logic) to provide signals to actuate the display.

Some transilluminated display devices are hardwired to the external elements with an individual line/wire to each transillumination display component (indicator bulb), and the individual line carries the "sense" signal (voltage) to actuate the display component. Other transilluminated displays incorporate an analog-to-digital (A/D) converter, sometimes in conjunction with a modem, to permit interconnection with external devices via telephone lines. For the latter kind of displays, the digital signal from the A/D is transformed into a "sense" signal by internal logic that will actuate the display component(s).

The primary performance parameter of the transilluminated display is legibility. Legibility is determined by the positioning, number and colors of the display components, the character size, the spacing and positioning of associated legends and ambient lighting. Most transilluminated displays operate best in areas where the luminance of the display is at least ten percent greater than the surrounding lighting. The characters of the identifying legends should be readable at a minimum distance of 28 inches (71 cm) in the operating environment and should have a height of at least one-eighth inch (0.3 cm). If viewing at greater distances (D) is required, the height should be increased by the factor D/28.

Some transilluminated displays that employ incandscent bulbs use dual-filament bulbs so that when one filament burns out, the decrease in intensity is apparent but not so much as to keep the user from noting an event until the bulb can be replaced. Furthermore, most displays of this category have a "press-to-test" feature which permits the user to periodically check the operation of the indicators.

TRANSILLUMINATED DISPLAYS

Manufacturer	Esterline Electronics Corp. 3501 N. Harbor Blvd. Costa Mesa, CA 92626 (714) 540-1234
Model	6416
Reference Evaluation Guide Procedure No. VII-3.A	NRC Identification No.

NARRATIVE DESCRIPTION

The Model 6416 Ultra-Scan Transponder is a remote monitoring unit of the Esterline Supervisory System. The display is of the transilluminated type in that the panel employs a series of indicator lights arranged in a column that provides a visual indication of the alarm status of each zone. Interface is with detectors directly or through a communications net.

PERFORMANCE DATA

Legibility:	Not applicable.
Indicator Visibility:	Self-contained illumination; visibility depends on ambient light.
Response Time of Display:	Information not available.
Display Mechanism:	Transilluminated display using a series of individual indicator lights.
Capacity:	Up to 8 zones, one of which can be line fault indication.
Illumination Requirements:	Self-contained.
Display Controls:	ON/OFF switch, Light test switch.
Resistance to Spoofing and Tampering:	Equipped with tamper switch.
Temperature:	32 to 120F (0 to 50C).
Humidity:	Information not available.
Other Environmental Characteristics:	Information not available.
Interface:	PCM or FSK modulation types, baud rate 222Hz. Line type: Type 3002, voice-grade dedicated, unconditioned 2 or 4 wire, splitbond; Impedance, 600 ohms; Signal Level, Odbm; Transmission Frequency 1070 and 1270Hz; Receive, 2025 and 2225Hz. Maximum — 8 loops of end-of-line resistor type with no alarm, R = 3600ohms; alarms when loop resistance is 1800 or 5400ohms. Alarm Delay = 0.1 second (alarm must be present for 0.1 seconds to be recognized).

PHYSICAL DATA

Size:	10.5x10.2x4.5in (27x26x11.5cm) (all exclusive of conduit couplings).
Weight:	Approximately 7lb (3.2kg).
Power (Primary/Secondary):	Primary, 12V ac, 50 to 60Hz, 0.7A; backup, 12V battery at 2.6Ah for 24 hours.
Emplacement:	Wall-mounted; wall space required (exclusive of conduits) 10.5x10.2in (26.7x25.9cm), protrudes; 4.5in (11.4cm) from wall (hinged panel closed) and 10.7in (27.2cm) (hinged panel open).

SUPPLY/LOGISTICS DATA

Documentation and Training:	Information not available.
Parts and Repairs:	Information not available.
Reliability:	Information not available.
Maintainability:	Information not available.
Warranty information:	Information not available.
Government or Professional Standards:	UL-listed.
Lead Time:	Information not available.

COST DATA

Unit Acquisition Cost:	Information not available.
Unit Installation Cost:	Information not available.
Training Cost:	Information not available.
Maintenance Cost:	Information not available.
Operation Cost:	Information not available.

NOTES

INSTALLATIONS

TRANSILLUMINATED DISPLAYS

Manufacturer Hathaway Instruments
5250 E. Evans Ave.
Denver, CO 80222
(303) 756-8301

Model 901

Reference Evaluation Guide Procedure No. VII-3.A NRC Identification No.

NARRATIVE DESCRIPTION

This is a small display which operates from dc power and is designed to monitor up to ten unattended detectors or processes. A two-position slide switch for each sensor selects either normally open or normally closed field contact operation. A panel light is lighted whenever any channel goes into the alarm state.

PERFORMANCE DATA

Legibility: ⅛in (0.3cm) characters.
Indicator Visibility: Nameplates are next to 24V incandescent lamps.
Response Time of Display: As fast as an incandescent lamp can respond.
Display Mechanism: Incandescent lamps.
Capacity: 10 inputs.
Illumination Requirements: Room ambient.
Display Controls: 10 access/secure switches; 1 Acknowledge; 1 Power On.
Resistance to Spoofing and Tampering: None.
Temperature: 0 to 140F (−15 to +60C) operating; 30 to 150F (−35 to +65C) storage.
Humidity: Information not available.
Other Environmental Characteristics: Information not available.
Interface: Switch closures N.O. or N.C.

PHYSICAL DATA

Size: 5¼x8¼x8in (13x21.5x30cm).
Weight: 5lb (2.3kg).
Power (Primary/Secondary): 125V dc or 48V dc; current approximately 750mA.
Emplacement: Desk-top.

SUPPLY/LOGISTICS DATA

Documentation and Training: Manuals are supplied; training is not required.
Parts and Repairs: Return to factory.
Reliability: Limited by derated lamp bulbs. At least 10,000 hours.
Maintainability: MTTR not available.
Warranty Information: One year, parts and labor.
Government or Professional Standards: None.
Lead Time: 60 to 90 days.

COST DATA

Unit Acquisition Cost:	$840.
Unit Installation Cost:	Nil.
Training Cost:	None.
Maintenance Cost:	$5. per year.
Operation Cost:	Information not available.

NOTES

INSTALLATIONS

TRANSILLUMINATED DISPLAYS

Manufacturer	Pulse D namics, Inc. 5515 We stfield Ave. Pennsau ken, NJ 08110 (609) 66 ?-4774
Model	803

Reference Evaluation Guide | Procedure No. VII-3.A | NRC Identification No.

NARRATIVE DESCRIPTION

The system is multiplexed a nd allows for connection of five transmitters to a surveillance line and is capable of attended or non-attended c peration.

PERFORMANCE DATA

Legibility:	Information not available.
Indicator Visibility:	Information not available.
Response Time of Display:	Information not available.
Display Mechanism:	Back illuminated white numerals which turn green when acknowledged.
Capacity:	50 zones.
Illumination Requirements:	Room ambient.
Display Controls:	Display can be audible or visual or stored for later use (see Note 1).
Resistance to Spoofing and Tampering:	Alarms when tampered with.
Temperature:	Information not available.
Humidity:	Information for available.
Other Environmental Characteristics:	Intended for indoor operation.
Interface:	2 relay outputs.

PHYSICAL DATA

Size:	Information not available.
Weight:	Information not available.
Power (Primary/Secondary):	115V ac, 60Hz; 24V dc.
Emplacement:	Desk-top console or wall-mounting.

SUPPLY/LOGISTICS DATA

Documentation and Training:	Installation instructions available. Training information not available.
Parts and Repairs:	Information not available.
Reliability:	MTBF not available.
Maintainability:	MTTR not available.
Warranty Information:	One year.
Government or Professional Standards:	Information not available.
Lead Time:	Information not available.

COST DATA

Unit Acquisition Cost:	$320. for 5-zone console; $2,688. for 60-zone wall model (2/1/74 prices); See notes 2 and 3.
Unit Installation Cost:	Information not available.
Training Cost:	Information not available.
Maintenance Cost:	Information not available.
Operation Cost:	Information not available.

NOTES

1. Display methods provide white back lit numerals which turn green when acknowledged, and a toggle switch adjacent to each zone numeral. When the toggle switch is turned on, no audible or visual alarms are made.
2. Model 803 (Model 801 does not provide the display options; costs $218., and must be attended).
3. Prices for models with different displays and capacities vary within these limits.

INSTALLATIONS

TRANSILLUMINATED DISPLAYS

Manufacturer Reisner, Inc.
240 No. Prospect St.
Hagerstown, MD

Model Versa-lite

Reference Evaluation Guide Procedure No. VII-3.A NRC Identification No.

NARRATIVE DESCRIPTION

This display board consists of alternating layers of cork and steel wool. On the face of the panel, a map, photograph or drawing, etc. is pasted or taped, and push-through lights are inserted at points indicating location of sensors, critical points, etc. Each light can be addressed individually in a manual or switch closure mode or through an interface with more automatic, i.e., computer-controlled, devices. A power supply can be obtained with the display panels.

PERFORMANCE DATA

Legibility: Information not available.
Indicator Visibility: 6V bulbs, various colors; color selection and ambient lighting customer-determined. Too bright an ambient will diminish legibility.
Response Time of Display: Switch closure, no time delay in display.
Display Mechanism: 6V incandescent bulbs.
Capacity: Power supply and panel size limits only. Currently available power supply provides 170 lights.
Illumination Requirements: No more than 30 foot candles (323 lm/m^2).
Display Controls: Customer-determined; may be manual (2-position switch) or processor-controlled.
Resistance to Spoofing and Tampering: None.
Temperature: 32 to 120F (0 to 50C).
Humidity: Information not available.
Other Environmental Characteristics: Intended for indoor use.
Interface: Switch closure interface.

PHYSICAL DATA

Size: Panel sizes vary from 24x32in (61x79cm) to 4x8ft (1.2x2.4m); non-standard sizes.
Weight: Board is approximately 4lbs per ft^2 (2kg per m^2).
Power (Primary/Secondary): 110V ac power supply transformed to 6V for board.
Emplacement: Wall-mounted.

SUPPLY/LOGISTICS DATA

Documentation and Training: Information not available.
Parts and Repairs: Information not available.
Reliability: MTBF not available.
Maintainability: MTTR not available.
Warranty Information: Board for one year; lights warranteed to work on delivery.
Government or Professional Standards: Information not available.
Lead Time: Information not available.

COST DATA

Unit Acquisition Cost:	Panels, $60 to $77 per ft^2; made to order at $77 per ft^2. Power supplies approximately $230 to $280 (up to 170 light capacity).
Unit Installation Cost:	Information not available.
Training Cost:	Information not available.
Maintenance Cost:	Light replacement at approximately $4.00 each.
Operation Cost:	Information not available.

NOTES

INSTALLATIONS

TRANSILLUMINATED DISPLAYS

Manufacturer	Von Duprin 400 W. Maryland St. Indianapolis, IN 46225	MRL, Inc. 7644 Fullerton Rd. Springfield, VA 22153 (703) 569-0195	Continental Instrs. Corp. 170 Lauman Lane Hicksville, NY 11801 (516) 938-0800
Model	C-400 Series DC-100 Series	CAB Series	

Reference Evaluation Guide Procedure No. VII-3.A NRC Identification No.

NARRATIVE DESCRIPTION

These security control and monitor consoles are built to handle large numbers of remote sensors such as fire, smoke or burglary detectors. The units are also capable of powering auxilliary devices such as doors and intercoms. The alarm indicators are audible and provide lamp readouts with switch control for acknowledge and test functions. Consoles are made in a wide variety of sizes and the number of zones handled can be very large.

PERFORMANCE DATA

Legibility:	Information not available.
Indicator Visibility:	Information not available.
Response Time of Display:	Information not available.
Display Mechanism:	Incandescent lights or LED's.
Capacity:	Varies from 1 to several thousand.
Illumination Requirements:	Ambient light is usually satisfactory.
Display Controls:	Acknowledge, Reset, Test.
Resistance to Spoofing and Tampering:	None.
Temperature:	Information not available.
Humidity:	Information not available.
Other Environmental Characteristics:	Information not available.
Interface:	To telephone dialers and computers.

PHYSICAL DATA

Size:	Varied; depends on purpose and location.
Weight:	Varied; depends on purpose and location.
Power (Primary/Secondary):	117V ac to 12 or 24V dc.
Emplacement:	19in (48cm) rack units, plus desk and floor mounting.

SUPPLY/LOGISTICS DATA

Documentation and Training:	Documentation supplied by manufacturer; minimum training required.
Parts and Repairs:	Return to factory.
Reliability:	MTBF not available.
Maintainability:	MTTR not available.
Warranty Information:	One year, parts and labor.
Government or Professional Standards:	None.
Lead Time:	Information not available.

COST DATA

Unit Acquisition Cost:	$150. to many thousand dollars.
Unit Installation Cost:	Information not available.
Training Cost:	Information not available.
Maintenance Cost:	Information not available.
Operation Cost	Information not available.

NOTES

INSTALLATIONS