

POTTER

SC-1080 SINGLE-CAPSTAN TAPE TRANSPORT AND SYSTEM



FEATURES

- Any bidirectional tape speed up to 150 ips
- Fully automatic tape loading — stops on load point
- Retractable Read/Write Head
- Unrestricted programming capacity
- IBM 7- and 9-channel (IBM 360 and ASCII) capability
- Speed tolerance $\pm 2\%$
- Information density to 800 bpi, NRZI; 1600 bpi, (P E)
- Single-capstan tape drive
- Data reliability — only surface in contact with oxide is read/write head. Head retracts during rewind
- No mechanical adjustments required
- Photoelectric tape position sensors
- All solid-state servo controls
- Long Life . . . minimum servicing
- U.L. Approved

GENERAL DESCRIPTION

The Potter Model SC-1080 represents a new design in tape transports. This tape system is one in a family of the industry's simplest, high-performance, single capstan tape transport.

The Potter SC-1080 is a single-capstan digital tape transport capable of bidirectional tape speeds to 150 ips with no program restrictions. The unit is completely compatible with IBM 729 and 2401 Tape Transports at all packing densities.

The SC-1080 is IBM 7- or 9-Channel compatible. Other ½- or 1-inch tape formats, including ASCII 9-channel, IRIG or TIAC* are available with packing densities to 800 bpi, NRZI, and 1600 bpi phase encoded recording.

The SC-1080 single capstan tape transport is designed for use with the highest performance computer systems. The transport features operator convenience, high transfer rate and high-speed rewind. The basic simplicity of the SC-1080 transport assures maximum data reliability and system up-time.

*TIAC is a registered trademark of Texas Instruments, Inc.

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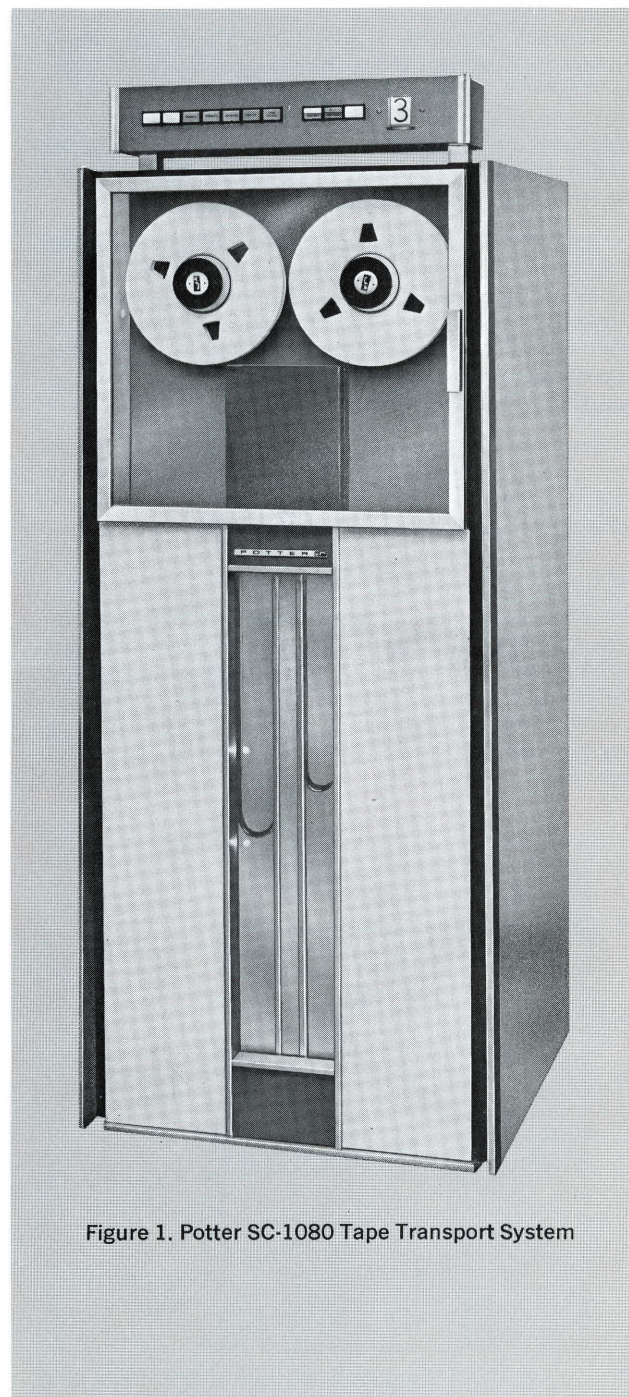


Figure 1. Potter SC-1080 Tape Transport System

TAPE LOADING

The tape drive design utilizes a single capstan to pass the tape across the read/write head. Tape is threaded from the supply reel, directly to the take-up reel on the left side of the transport. When the LOAD pushbutton is pushed, tape is automatically dropped into the vacuum columns, the read/write head is moved into position and tape is driven to the LOAD point and automatically switched from LOCAL to REMOTE.

TAPE PATH

In normal forward/reverse operation the oxide touches no surface except the read/write head, while the Mylar™ side of the tape is guided gently to eliminate wear particles, greatly increasing tape life and data reliability. During rewind the read/write head is retracted to a neutral position out of contact resulting in longer head/tape life.

Control of the tape path is maintained by a precision edge guidance system guaranteeing IBM interchange. Data may be transferred to or from the tape transport at standard bit densities of 200, 556, 800 and 1600 bpi or at any other transfer rate up to 240 kc at 150 ips. Tape tension is uniform throughout the entire reel, resulting in a smooth even pack.

During rewind a vacuum column maintains constant tension. There are no guide rollers, air guides or tension arms to restrict performance. Complicated mechanical adjustments are eliminated.

TAPE GUIDANCE SYSTEM

The tape guidance system of the SC-1080 was designed to be compatible with the IBM series 729 and 2401 tape transports. This design enables tapes to be freely interchanged between the above machines. Potter specifies the dynamic skew of the SC-1080 in terms of the IBM 729 Mod VI (see specification back page).

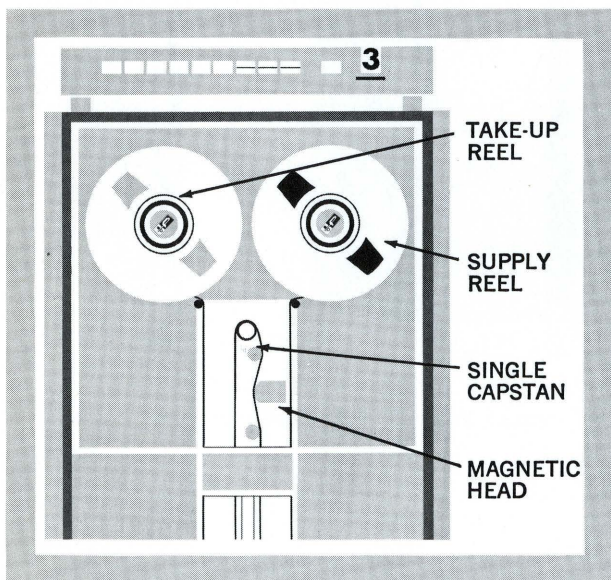


Figure 2. New Single-Capstan Tape Drive System and Direct Tape Path is Ultimate in Design Simplicity

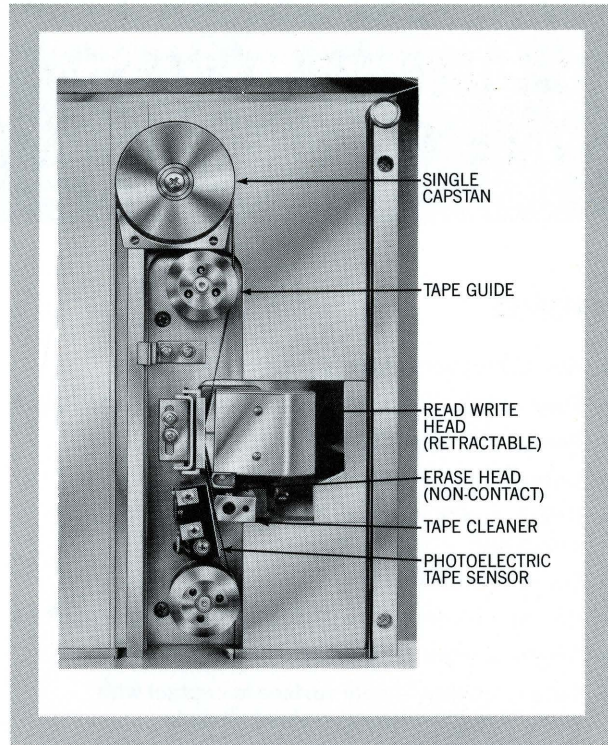


Figure 3. Precision Tape Guidance System

LOW INERTIA CAPSTAN DRIVE

A low inertia drive provides rapid linear acceleration and deceleration while maintaining control of the tape on the capstan at all times.

The tape is driven as shown in Figure 3 by passing the tape 180° around a metal capstan coated with a resilient material. Sufficient force is applied to the Mylar side of the tape by the vacuum capstan to preclude slippage of the tape with respect to the capstan.

The capstan is directly driven from a high-performance dc motor which utilizes a combination of integrated and discrete solid state drive circuitry. Program restrictions of any kind are completely eliminated so that any sequence of commands, FWD/REV, FWD/STOP or REV/STOP may be given with no intermediate delays up to a maximum of 200 commands/second. No longer are "stop-delays" or "FWD/REV delays" required. Internal circuitry "remembers" command sequences and executes them properly, eliminating any requirements in tape control units. Maximum input rate may be sustained up to 5 minutes at 150 ips.

REEL SERVOS

The tape position in the vacuum columns is controlled by two "closed-loop" servo systems, one column for the left reel and one column for the right reel. Position is detected by photoelectric cells in the tank which drive the servo amplifier to control the servo motor to pay out tape into, or take up tape from the vacuum column as required to follow capstan movement. The servo motor utilizes a dynamic braking system which eliminates mechanical brakes and

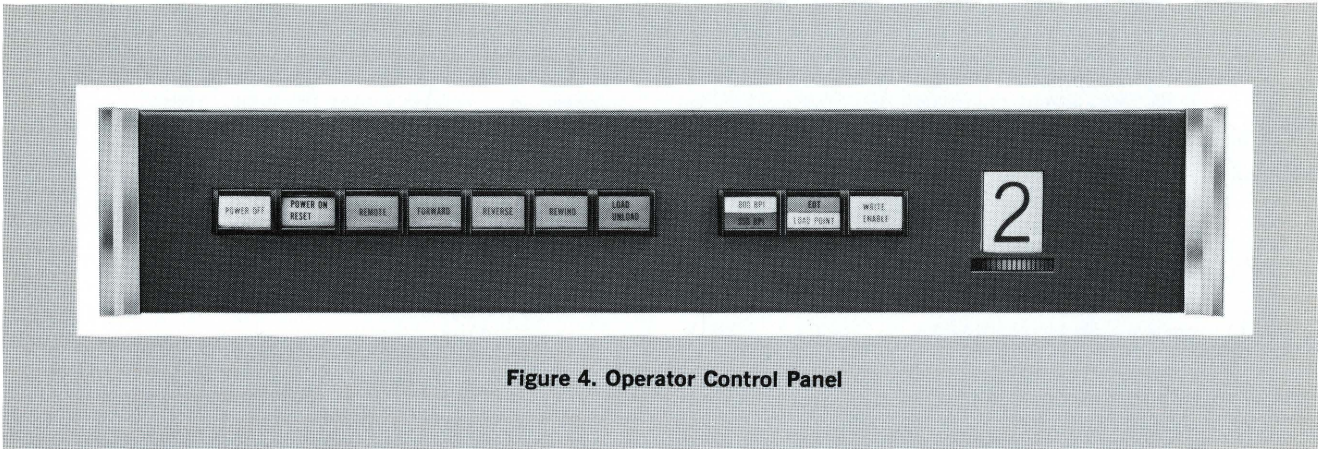


Figure 4. Operator Control Panel

adjustments. The new system is fail safe even if AC power is interrupted during high-speed rewind, providing maximum tape protection.

An operator control panel is an optional feature for local operation and indication. Indicators and switches as shown in Figure 4 show the status of the system under local or remote conditions. The local controls include Power ON/Power OFF, Forward, Reverse, Rewind, Load and Unload.

AUTOMATIC TAPE LOADING

Tape loading is the easiest and fastest in the industry with Potter's new single-capstan transports. All that is necessary is to first mount the supply reel on the QUICK-LOCK® hub assembly. Tape is then threaded from the supply reel directly to the take-up

reel. From this point loading is accomplished fully automatically at a touch of the LOAD button. Tape is pulled into the vacuum tanks, the head is positioned, and tape is advanced to the load point. The transport will then automatically switch from LOCAL to REMOTE and be ready for the first computer command. Threading around rollers, multiple capstans, and guides is completely eliminated.

DRIVE ELECTRONICS

Drive electronics are all solid-state (silicon on low level stages) or integrated circuitry.

All circuits are mounted on removable printed circuit modules. Test points are provided where required for routine maintenance or service checks. The drive electronics include all modular power supplies required for transport operation.

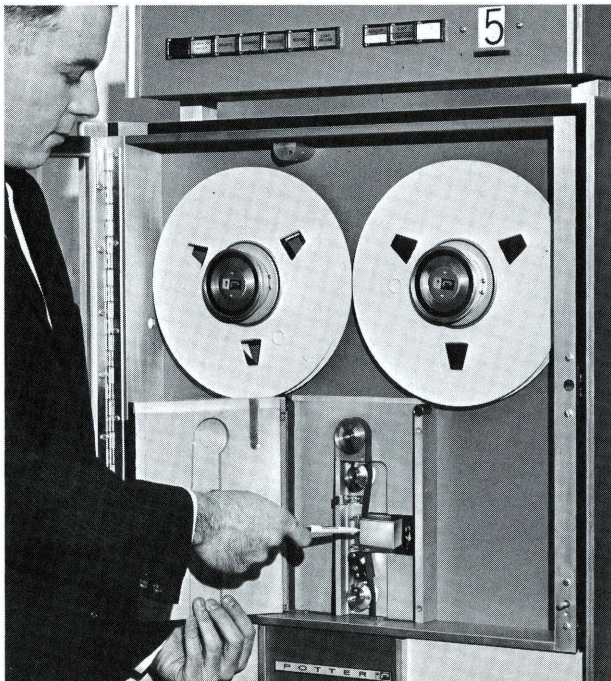


Figure 5. Automatic Tape Loading

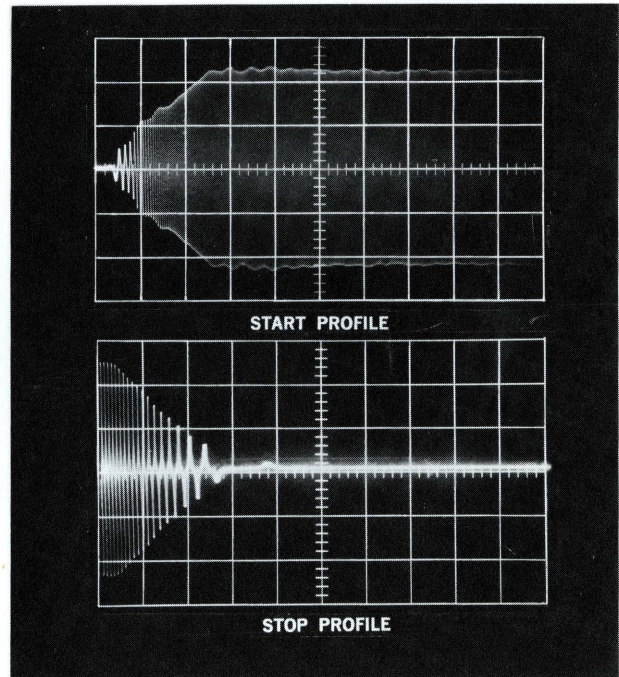


Figure 6. Start/Stop Profiles at 150 ips (1 ms/cm)

RELIABILITY AND MAINTENANCE

Reliability of operation is a prime requisite of computer peripheral equipment. The SC-1080 has been planned with this consideration receiving major attention. The mechanical design incorporates a minimum of moving parts with all electronic components derated to conservative levels. There are no mechanical adjustments, and only a minimum number of electrical adjustments are necessary in the operation of the SC-1080 transport.

EQUIPMENT

The basic Potter SC-1080 transport consists of the following subassemblies:

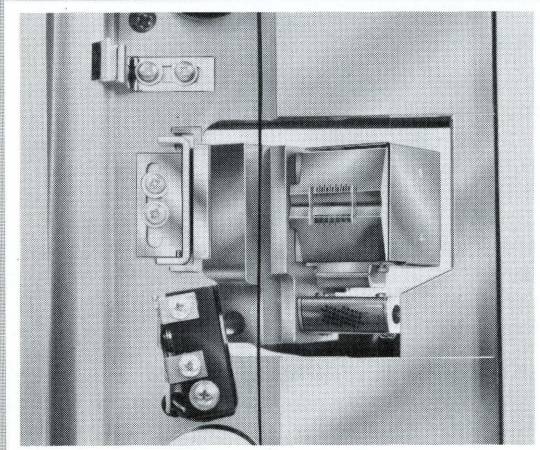
- The tape transport assembly including all tape drive components
- Beginning-of-tape (BOT) sensor, photoreflexive IBM-type, plus amplifier
- End-of-tape (EOT) sensor, photoreflexive IBM-type, plus amplifier
- Transport drive electronics
- Two IBM-type QUICK-LOCK hubs
- One empty IBM-type plastic take-up reel
- Retractable Head Mount
- Safety Glass Dust Cover
- Tape Cleaner

®QUICK-LOCK is a registered trademark of Potter Instrument Company, Inc.

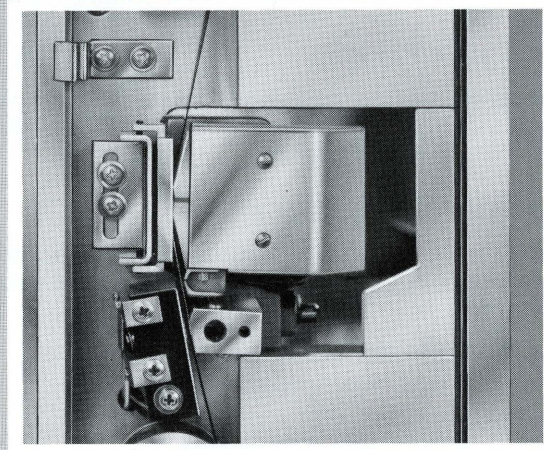
- Optional Accessories —
 - Operator Control Panel without address select
 - Operator Control Panel with address select switch (seven position)
 - Master Reel Write Lockout, (File Protect), IBM-type switch
 - Dual gap read/write head assembly for 7-channel (IBM 729) operation: 0.048 inch write and 0.030 inch read tracks on 0.070 inch centers. Gap spacing 0.300 inch.
 - Dual gap read/write head assembly for 9-channel (IBM 2401 or ASCII) operation: 0.044 inch write and 0.040 inch read tracks on 0.055 inch centers. Gap spacing: 0.150 inch.
 - Other compatibilities are available
 - Erase Head
 - 50 cycle and/or 230 VAC Input Power
 - Special Paint (paint supplied by customer)
 - Cabinet

All Potter equipment is supplied with mating connectors.

For further information, write, wire or call General Sales Manager, Potter Instrument Company, Inc., East Bethpage Road, Plainview, N. Y. 11803. Telephone (516) 694-9000. TWX 510-224-6485. CABLE: PICO.



POSITION 1 for vacuum column loading and non-contact hi-speed rewind



POSITION 2 for tape contact for reading and writing

NEW RETRACTABLE HEAD PROVIDES FOR LONGER LIFE

The read/write head assembly is mounted on a 2-position hinged plate: retracted to permit vacuum column loading (position 1), or for rewind, and in

contact with tape for reading and writing (position 2). This action is controlled by a cam controlled positioning motor. Special construction methods have been employed to insure repeated positioning accuracy.

ACCESSORIES

Dual-Gap Read/Write Head

The dual-gap read/write head assembly uses an all-metal flush surface housing for longer life and greater reliability. The assembly is non-adjustable and can be replaced by normally skilled maintenance personnel. The read/write head assembly is designed for operation at transfer rates to 240 kc (150 ips and 1600 bpi).

A complete selection of magnetic heads is available, including heads for IBM 7- or 9-channel format. Heads are all-metal, precision fabricated for maximum tape life and minimum interchannel time displacement.

Reel and Hub Assemblies (Standard on SC-1080)
IBM-compatible hubs and one IBM-compatible tape reel are provided. Potter's IBM-compatible QUICK-LOCK hub assembly, a significant development in tape transport technology is provided as standard equipment with the SC-1080.

EOT/BOT Sensing (Standard on SC-1080)

A dual-channel photoelectric sensor is provided immediately adjacent to the read/write head assembly to detect the presence of standard IBM photoreflective strips attached to the Mylar™ side of the tape for indicating the load point and end-of-tape positions. A two-channel amplifier with logic level outputs is provided.

WRITE LOCKOUT (OPTIONAL)

A non-contact write lockout, or file protect, switch is mounted at the supply reel hub. A single form "c" contact is brought to the transport interface connector. This switch may be wired to Potter MA-series amplifiers to provide automatic write inhibit.

LOGIC CONVERSION

A standard logic conversion board is available to provide any input/output logic of "0"s and "1"s in the gnd, -5V or gnd, +5V range.

READ-WRITE ELECTRONICS

Standard read/write amplifiers are available to accommodate packing densities up to 1600 bpi and data transfer rates up to 240 kc.

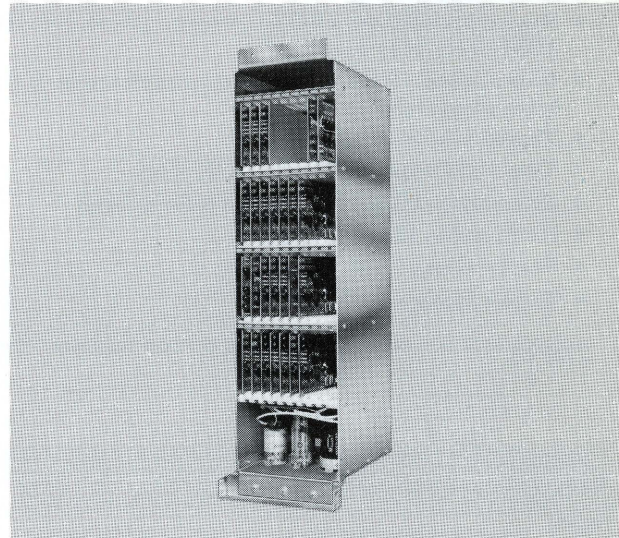
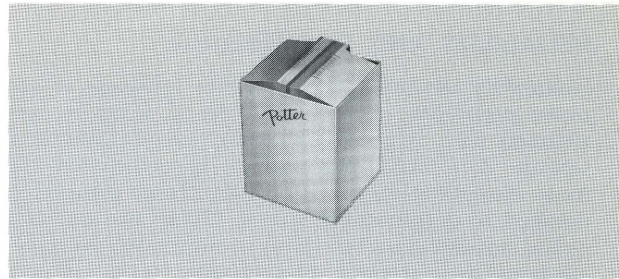
Each read/write electronics assembly contains:

- up to 9 read-write amplifier channels
- clock generator
- write inhibit electrical switching
- erase head control
- head compensation for Read/Write (as required)

SWITCHING ELECTRONICS

Switching amplifiers are available which reduce the cost of digital magnetic tape systems by permitting time-sharing of a single Read/Write amplifier package among groups of up to four tape units.

™Armorhide is a registered trademark of J. L. Armitage Co.
™Mylar is a trademark of E. I. du Pont de Nemours Company, Inc.



CABINET

The newly styled modular cabinet with tubular steel frame is equipped with rear service access doors, less side panels. The cabinet includes AC power control panel, with Hubbel™ twist lock 3-wire receptacle with mate; cabinet fan with filter. Side panels (specify right or left when facing transport) are also provided. The cabinet will accommodate all transport components, drive electronics, power supply and accessories that comprise the system, as well as read/write electronics.

If transport is ordered without cabinet, a simplified mounting frame is provided to facilitate shipping and handling. This frame provides a convenient means of testing and moving the transport.

STANDARD COLORS:

Cabinet — ARMORHIDE™ Light Grey Textured #U-621

Transport Panel and Operator Control Panel — ARMORHIDE Medium Grey Textured #U-242
Decorative Trim — ARMORHIDE Ocean Blue #U-11695.

SPECIFICATIONS

TAPE DRIVE	Single Capstan
TAPE LOADING	Fully automatic tape loading in less than 15 seconds Automatic BOT searching
TAPE SPEED 1/2 inch.....	any speed between 75 ips and 150 ips
1 inch.....	any speed between 75 ips and 90 ips
TAPE SPEED VARIATION (steady state)	±2%
REWIND SPEED AND TIME (2400 ft. reel)	100 sec avg, (288 ips avg) 130 sec max,
PACKING DENSITY	200, 556, 800 bpi NRZI 1600 bpi PE
PROGRAM RESTRICTIONS	none within IBM IRG specifications

TYPICAL PERFORMANCE

(1/2 inch 1.5 mil Mylar).....	75 ips	112.5 ips	150 ips
Start time (to within 10% of speed).....	5 ms	4 ms	3.25 ms
Start distance — inches.....	.185±.020	.225±.025	.225±.025
Stop time (max).....	5 ms	4 ms	3.25 ms
Stop distance — inches.....	.160±.020	.200±.020	.210±.020
(1 inch 1.5 mil Mylar).....	75 ips		90 ips
Start time (to within 10% of speed).....	5 ms		4 ms
Start distance — inches.....	.185±.020		.180±.020
Stop time (max).....	5 ms		4 ms
Stop distance — inches.....	.160±.020		.160±.020
Command Repetition rate.....	200 command/sec see text p. 2 "Low Inertia Capstan Drive" section		
SPEED STABILITY (long term 1 sec)	±2%		
(short term 15 ms).....	±2%		

SKREW 1/2-inch machines*

(a) Static usec.....	75 ips	112.5 ips	150 ips
	3 usec	2 usec	1.5 usec
(b) Dynamic** usec peak.....			
guidance + reading all 1's tape.....	2.5 usec	1.5 usec	1.2 usec
guidance + head + reading random tape.....	4.0 usec	2.5 usec	2.0 usec

*For 1 inch machines double the figures given for 1/2 inch machines.

**The dynamic skew figure is specified when reading on the SC1080 a tape which has been generated on an IBM 729-VI or for reading tapes on the IBM 729-VI generated on the SC1080.

TAPE WIDTH	1/2" or 1"
TAPE TYPE	3M8938, or equal; 1.5 mil Mylar
TAPE REELS	Standard 10 1/2"
REEL HUBS	Potter QUICK-LOCK IBM-compatible 1/2" or NARTB 1"

REMOTE CONTROL INPUTS

- a. Logic Levels 0/+5 standard, 0/-5, -5/0, +5/0 optional.
- b. Input Commands
Unit Select, Direction, Run, Rewind, Rewind and Unload

STATUS REPLIES

- EOT/BOT, Ready, Unit Selected and Ready, Rewinding
- Write Lockout (Form C contact)

ELECTRONICS..... All control circuits fully transistorized or integrated, modular plug-in construction throughout

SERVO CONTROL..... All solid state with dynamic braking eliminating mechanical brakes

ENVIRONMENTAL CONDITIONS

- Ambient Temperature — Operating (within tape characteristic)..... 45°F to 110°F
- Non-Operating..... -30°F to 165°F
- Humidity..... 20% to 80% (without condensation)

POWER..... 115V AC ±10%, 50/60 cps, single-phase or 220V AC optional
10 amperes — Standby
12 amperes — Running
15 amperes — Peak (less than 100 ms)

DIMENSIONS	Height	Width	Depth
Transport/Cabinet (without control panel).....	63"	26 1/2"	27 1/4" + Door Handle
With Control Panel.....	68 1/2"	26 1/2"	27 1/4" + Door Handle

WEIGHT

- Transport Only (with shipping frame)..... 384 lbs.
- Transport with Cabinet..... 500 lbs. approx.

U.L. APPROVED..... Underwriters' Laboratories has granted U.L. Listing when SC-1080 is supplied in Potter Standard Cabinet.



POTTER INSTRUMENT COMPANY, INC.

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