

POTTER

# SC-1060 SINGLE-CAPSTAN TAPE TRANSPORT SYSTEM



11/14/68 812K

## FEATURES

- Any bidirectional tape speed up to 150 ips
- Easy tape loading — stops on load point
- 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, phase modulated recording
- Revolutionary new single-capstan tape drive
- Data reliability — only surface in contact with oxide is read/write head
- No mechanical adjustments required
- Photoelectric tape position sensors
- All solid-state servo controls
- Long Life . . . minimum servicing

## GENERAL DESCRIPTION

The Potter Model SC-1060 is a high-performance, single-capstan digital tape transport capable of bidirectional tape speeds to 150 ips. The unit is completely compatible with IBM 729 and 2401 series Tape Transports at all packing densities.

The SC-1060 is IBM 7- or 9-Channel compatible. Other  $\frac{1}{2}$ - 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 modulated recording.

The SC-1060 is designed for use with high performance computer systems. The transport features operator convenience, high transfer rate and high-speed rewind. The basic simplicity of the system assures maximum data reliability and system up-time.



Figure 1. Potter SC-1060 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, over the read/write head to the take-up reel on the left side of the transport. When the LOAD push button is pushed, tape is automatically dropped into the vacuum columns, 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. Simple loading with Potter IBM-compatible QUICK-LOCK™ hubs enhances operator convenience.

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 192 kc at 120 ips. Tape tension is uniform throughout the entire reel, resulting in a smooth even pack. During rewind a vacuum column maintains constant tension, and the tape does not contact the read/write head, but "floats" on an air film over the head because of the unit's high rewind speed — over 360 ips. There are no vacuum or pressure switches, guide rollers, air guides or tension arms to restrict performance. Complicated mechanical adjustments are eliminated.

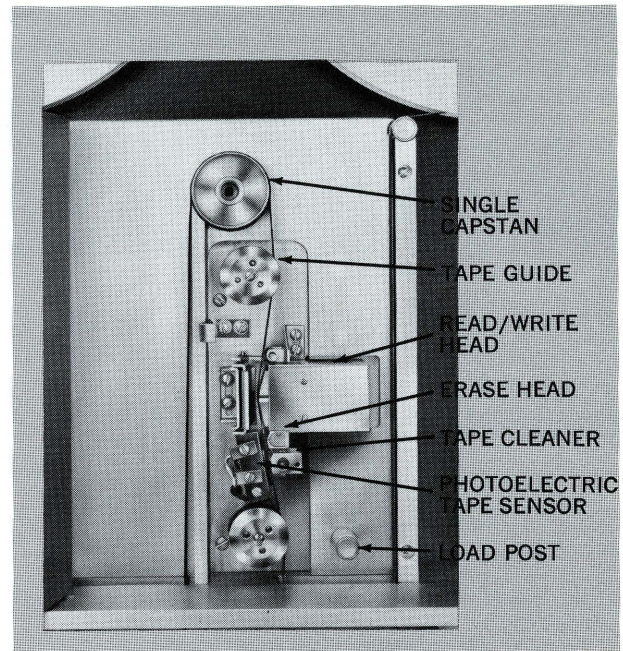


Figure 3. Precision Tape Guidance System

**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.

**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 forever, mechanical brakes and adjustments. No tachometers or other velocity sensors are required. The new system is fail-safe even if AC power is interrupted during high-speed rewind, providing maximum tape protection.

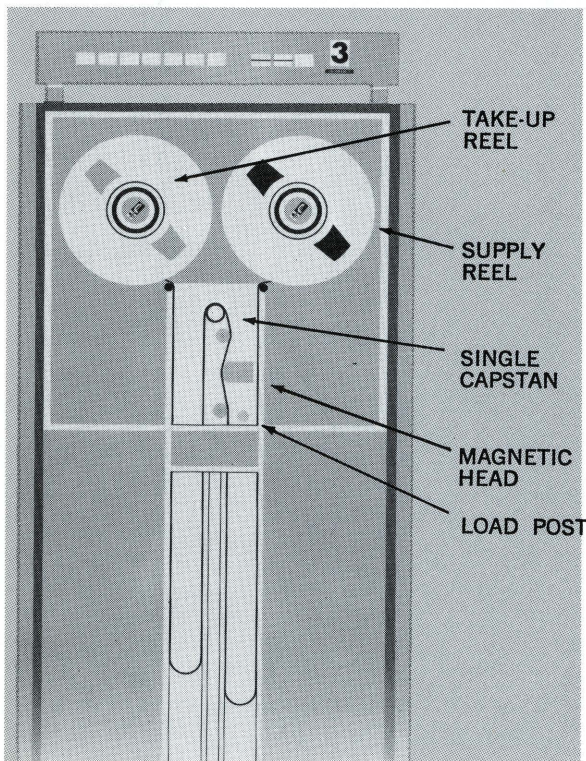


Figure 2. New Single-Capstan Tape Drive System and Direct Tape Path is Ultimate in Design Simplicity

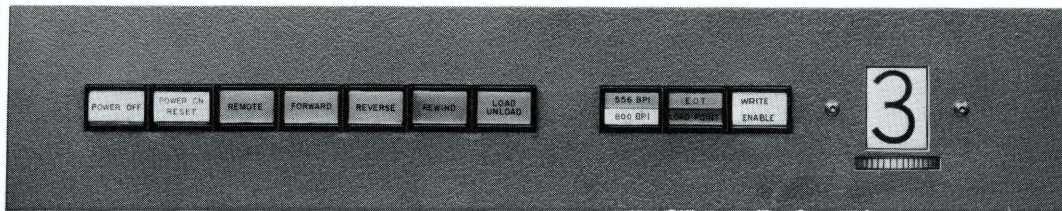


Figure 4. Operator Control Panel

**OPERATOR CONTROLS**

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.

**SIMPLIFIED TAPE LOADING**

Tape loading is easier and faster than ever before with Potter's new single-capstan transport. All that is necessary is to first mount the supply reel on the QUICK-LOCK hub assembly. Then thread tape from the supply reel, over the head assembly 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 and advances to 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.

**EQUIPMENT**

The basic Potter SC-1060 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 reel with File Protect Ring.
- Safety Glass Dust Cover

**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 write-check read 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 write-check read 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.



Figure 5. Simplified Tape Loading

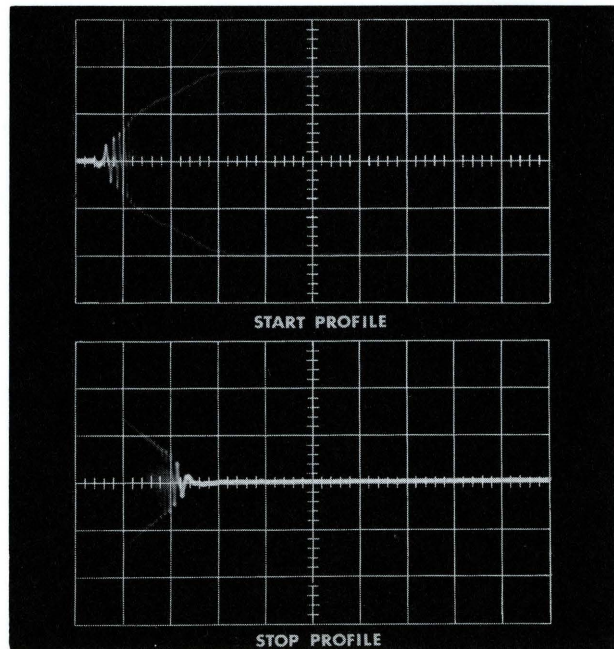


Figure 6. Start/Stop Profiles at 120 ips.

**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 192 kc (120 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)**

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-1060.

**EOT/BOT Sensing (Standard)**

A dual-channel photoelectric sensor is provided immediately adjacent to the read/write head assembly to detect the presence of standard IBM photoreflexive 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**

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**

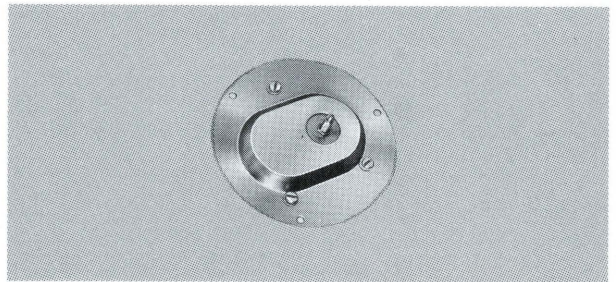
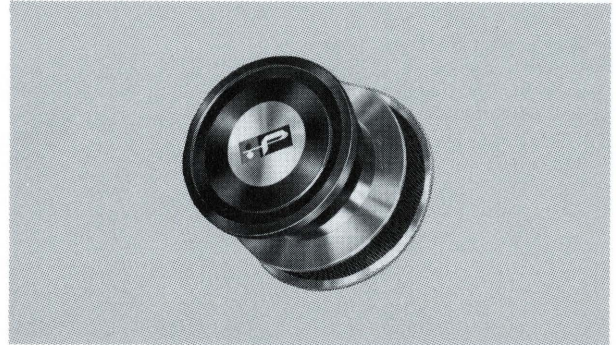
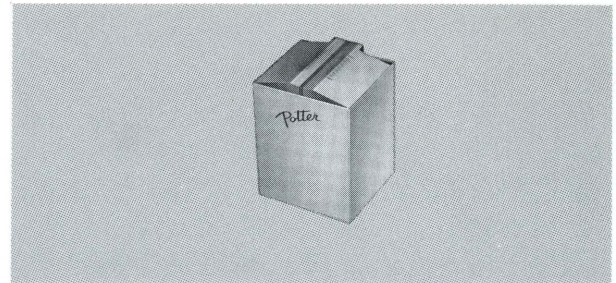
Standard read/write amplifiers are available to accommodate packing densities up to 1600 bpi and data transfer rates up to 192 kc.

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)
- power supply

\*QUICK-LOCK is a trademark of Potter Instrument Company, Inc.

™Mylar is a trademark of E. I. duPont 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. The drive and read/write electronics are accessible for front access servicing.

**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 SPEED					
Standard Speeds.....	75, 90, 112.5, 120, 150 ips				
Max. Speed 1/2 inch.....	150 ips				
Max. Speed 1 inch.....	90 ips				
TAPE SPEED VARIATION					
Steady State.....	±2%				
Short Term (15ms).....	±2%				
REWIND SPEED.....	290 ips, nominal				
Rewind Time.....	Less than 130 seconds for a full 2400' reel				
PACKING DENSITY.....	200/556/800 bpi, NRZI 1600 bpi, phase modulated recording				
PROGRAM RESTRICTIONS (1/2- or 1-inch tape).....	None				
TYPICAL PERFORMANCE					
(1/2" 1.5 mil Mylar).....	75 ips	90 ips	112.5 ips	120 ips	150 ips
Start Time (to within ±10% of speed, max.).....	5ms	4ms	4ms	4ms	3.25ms
Start Distance.....	0.185 ±.020"	0.180 ±.020"	0.225 ±.025"	0.240 ±.030"	0.225 ±.025"
Stop Time.....	5ms	4ms	4ms	4ms	3.25ms
Stop Distance.....	0.160 ±.020"	0.160 ±.020"	0.200 ±.020"	0.215 ±.020"	0.210 ±.020"
Command Repetition Rate.....	Any sequence up to 200 commands/second				
SKEW					
Static μsec, max.....	225/ips				
Dynamic μsec, peak.....	180/ips				
Dynamic Skew: Tape written on SC-1060 and read on IBM 729-VI or written on IBM 729-VI and read on SC-1060 transport.					
TAPE WIDTH.....	1/2" or 1"				
TAPE TYPE.....	3M8938, or equal; 1.5 mil Mylar				
TAPE REELS.....	diameter reels IBM-type 10 1/2-inch—1/2-inch NAB 10 1/2-inch—1-inch				
REEL HUBS.....	Potter QUICK-LOCK IBM-compatible hubs.				
TAPE LOADING.....	Complete tape loading and threading in less than 15 seconds				
REMOTE CONTROL INPUT/OUTPUT.....	INPUT LOGIC LEVELS:		OUTPUT LOGIC LEVELS:		
	1. 1=+5 to +15V 5ma 0=0V±1.0V 3ma		1. 1=+5V±1.0V 3ma 0=0V±1.0V 20ma		
	2. 1=0V±1.0V 3ma 0=+5 to +15V 5ma		2. 1=0V±1.0V 20ma 0=+5V±1.0V 3ma		
	3. 1=-5 to -15V 5ma 0=0V±1.0V 1ma		3. 1=-5V±1.0V 3ma 0=0V±1.0V 20ma		
	4. 1=0V±1.0V 1ma 0=-5 to -15V 5ma		4. 1=0V±1.0V 20ma 0=-5V±1.0V 3ma		
STATUS REPLIES.....	EOT; BOT; Ready, Rewinding; Write Lockout form "c" contact				
ELECTRONICS.....	All control circuits fully integrated circuits or with transistorized 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°-110°F				
—Non-operating.....	0°F - 165°F				
HUMIDITY.....	20% to 80% (without condensation)				
POWER.....	115V AC ±10%, 60 cps, single-phase (50 cps/230V 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" (excl. Door handle)		
With Control Panel.....	68 1/2"	26 1/2"	27 1/4" (excl. Door handle)		
WEIGHT.....	500 pounds, approx.				

**RELIABILITY AND MAINTENANCE**

Reliability of operation is a prime requisite of computer peripheral equipment. The SC-1060 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 transports.

**POTTER WORLDWIDE FIELD SERVICE AND LOGISTICS PROGRAM**

Repair centers in strategic locations within the continental United States and abroad have been established to support the entire Potter product line.

Staffed by highly-trained field representatives, these repair centers are equipped to effect on-site installation of equipments and to perform quality repair, maintenance and overhaul.

Supplementing this capability, if a customer prefers to provide his own equipment support, Potter has established standard instruction courses to train customer personnel, either at Potter or in the field.

A Spare Parts Department, backed up by an extremely large inventory, and streamlined order processing, is available for customer convenience and economy. This inventory permits the customer to

realize virtual elimination of downtime as well as savings on spare parts dollars by offering expeditious delivery for replaceable parts. Delivery is available in 24 hours to meet customer emergency requirements — within one week for standard parts under normal conditions. Potter also offers provisioning and logistics capabilities to meet all existing military specifications. The Potter field service and logistics program is one of the finest in the EDP equipment industry. With reliable, quality-engineered equipment, supported by comprehensive field service, Potter guarantees satisfaction.

**POTTER TAPE TRANSPORTS AND TRANSPORT SYSTEMS**

Potter offers the world's broadest line of digital tape transports and tape transport systems.

Tension arm, vacuum-column, single-capstan and incremental transports are available, as well as a complete line of components and accessories, including read/write amplifiers, magnetic heads, drive electronics, manual controls, QUICK-LOCK hubs and cabinets.

In the single-capstan series, units are available with tape speeds to 150 ips at all packing densities with unrestricted programming.

For further information, write, wire or call General Sales Manager, Potter Instrument Company, Inc., East Bethpage Road, Plainview, New York. Telephone (516) 694-9000 TWX 510-224-6485.

**SALES AND SERVICE OFFICES**

**NORTHEAST DISTRICT**

East Bethpage Road  
Plainview, L.I., N.Y. 11803  
Telephone: (516) 694-9000  
New York City: (212) 895-8786  
TWX: 510-224-6485  
CABLE: PICO

1400 Spring St.  
Silver Spring, Maryland 20910  
Telephone: (301) 588-0030

RD #1 (Shelley Road)  
Schwenksville, (Philadelphia), Pa. 19473  
Telephone: (215) 323-2590

3 Erie Drive  
Natick (Boston), Massachusetts 01760  
Telephone: (617) 235-4727

**NORTH CENTRAL DISTRICT**

18610 West Eight Mile Road  
Southfield, Michigan 48075  
Telephone: (313) 353-9822-3

**MINNESOTA DISTRICT**

4940 Viking Drive  
Minneapolis, Minnesota 55424  
Telephone: (612) 920-4973  
TWX: 910-576-2947

**SOUTHWEST DISTRICT**

715 East Mission Drive  
San Gabriel, California 91776  
Telephone: (213) 283-8177  
TWX: 910-589-3372

P.O. Box 60338  
Houston, Texas 77060  
Telephone: (713) MI 3-2114  
TWX: 910-881-2575

**INTERNATIONAL SALES OFFICES**

**POTTER INSTRUMENT COMPANY, LIMITED**

McGraw-Hill House, Maidenhead, Berkshire, England  
Telephone: MAIDENHEAD 20361, CABLE: PICO MAIDENHEAD  
TELEX: 851-84330

**FACIT AB**

Data Products Department  
Fack  
Solna 1, Sweden  
Telephone: Solna 08/29 00 20  
TELEX: 19035  
CABLE: FACIT SOLNA

**CANADA**

MEGATRONIX, LTD.  
1800 Avenue Road  
Toronto 12, Ontario, Canada  
Telephone: (416) 783-3329

**FACIT GmbH**

Bonner Strasse 117  
Düsseldorf, West Germany  
Telephone: 791101  
TELEX: 858-2415  
CABLE: FACIT DÜSSELDORF

**JAPAN**

MUNZIG INTERNATIONAL, INC.  
660 S. Western Avenue  
Los Angeles, California 90005  
Telephone: (213) DUNKirk 2-1276



**POTTER INSTRUMENT COMPANY, INC.**

EAST BETHPAGE ROAD • PLAINVIEW, L.I., NEW YORK 11803 • (516) 694-9000

Information subject to change without notice.