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FEATURES

- Front panel transport select
- Tape velocity to 37.5 ips
- IBM and ANSI compatible
- Phase-encoded 1600 cpi, 9-track
- Multi-density 7-track NRZI — 800, 556, or 200 cpi
- Multi-format 7 and 9-track read only units
- Front accessibility of all electronics
- Read-after-write dual gap or read/write single gap heads
- Transfer rates to 60,000 characters per second
- Forward and reverse read
- Dynamic electrical braking
- Buffer arm, photo-translator
- Exclusive "Edit" capability
- Tape cleaner
- Capstan speed disk
- Pressure sensitized take-up reel
- Programmed data recovery



LOW COST, HIGH PERFORMANCE 8 $\frac{1}{2}$ INCH REEL TRANSPORTS

The Pertec 8 $\frac{1}{2}$ -inch reel tape transport provides exceptional performance and reliability in the reading or writing of 7 or 9-track NRZI or phase encoded tapes. Engineered and designed to reduce operator and maintenance costs, these IBM and ANSI compatible tape transports are the front-runners of their class. Read-after-write, read/write, and read only models are available with tape speeds to 37.5 ips and data transfer rates up to 60,000 characters per second.

The Pertec 5000-Series offers the user superior

reliability and ease of operation required by the following applications areas:

- Key-to-Tape
- Optical Character Recognition
- Data Acquisition
- Point-of-Sale Devices
- Data Terminals
- Data Communications
- Mini Computers
- Off-Line Systems

FUNCTIONAL DESCRIPTION

The Pertec pressure sensitized take-up reel assures operator convenience and easy loading on all 5000-Series machines. The tape unit is designed to ensure IBM and ANSI tape interchangeability, whether the application requires read/write single gap head models, or read-after-write dual gap head versions. Head and guide geometry is configured to be compatible with IBM's requirements so as to eliminate dynamic tape skew caused by normal tape slitting irregularities. Tape tension is also carefully regulated to conform with IBM standards in order to minimize potential interchange hazards arising from excessive tape stretching or cinching.

Pertec 5000-Series read/write and read-after-write transports are available in 9-track versions with data densities of 800 cpi (NRZI) or 1600 cpi (phase encoded), or in 7-track NRZI versions with any two standard data densities (800, 556, and 200 cpi).

Pertec's 5000-Series transports are also available in read-only configurations with multi-format capabilities. The models offered provide forward and reverse read with programmed data recovery for reading older or marginal-amplitude tapes. An extra low threshold is remotely selectable, as is a high timing margin which allows reading tapes with questionable skew. These transports are available in 9-track phase-encoded, 9-track NRZI, or a combination of both phase-encoded and NRZI. Also, 7-track read-only models are available to read any two 7-

track densities. A combination of 7- and 9-track units are also available to provide multi-format read capability. Dual-speed units provide an advantage when a constant transfer rate is required. This capability permits halving the speed when reading phase-encoded tapes recorded at twice the data density of 9-track NRZI.

All models incorporate Pertec's industry standard interface which provides plug compatibility with the entire family of Pertec synchronous transports.

The simple single capstan and tape path of the 5000-Series provide the ultimate in tape handling, requiring only 12¼" of rack height. The unit includes data electronics, load point logic, tape motion control electronics, and a number of high performance features such as single potentiometer electronic deskewing, photo-electric buffer arm sensors, and tape cleaner. The product is designed to qualify for both UL and CSA approval.

In support of its tape drive customers, Pertec offers interface-compatible data formatter units which contain the data timing and control functions normally provided in an external tape control unit. Through the simple data formatter interface, a user can transfer data to and from phase encoded and/or NRZI transports without having to concern himself with any of the tape related housekeeping or data recovery logic. This is all done within the Pertec data formatter.

EQUIPMENT DESCRIPTION

The 5000-Series transport consists of five major assemblies: the deck assembly, power supply, tape control logic, power and servo control electronics, and data electronics. For simplified troubleshooting and repair, the tape deck assembly swings out to provide front access to

major electro-mechanical components and printed circuit boards.

Basic Deck Assembly

The construction of the basic deck assembly uses a cast aluminum deck plate on which the major subassemblies are mounted. All mechani-

cal components utilize a single reference plane for precise location of critical tape path guides and the head itself. In addition, the precision frame serves as the base plate for the following major subassemblies:

- **Head and guide plate assembly.** These important elements are precisely aligned on a precision plate to allow both forward and reverse reading without troublesome and unreliable single shot adjustments. The critical static skew adjustment is factory-set and is not considered a field adjustment.
- **Single capstan drive.** Tape motion is controlled by a single capstan drive using a low inertia, dc servo-motor. Velocity feedback from a dc tachometer provides the stable speed characteristic required to generate IBM and ANSI compatible tapes. For ease of service and preventative maintenance, the capstan has a built-in strobe disk allowing speed checks to be made with either 50 or 60 Hz ambient light.
- **Reel servo system.** All Pertec 5000-Series transports feature an indirect reel drive servo — a field-proven principle resulting in minimum power consumption and, therefore, higher reliability for servo electronics. As another consequence, the replacement of a reel motor is greatly simplified and can be accomplished from the rear of the transport without removal of the front trim. The alignment and perpendicularity of the motor shaft is not critical... a big plus in minimizing overall system down time.

Tension arm position information is provided through a special Pertec innovated photo-translator located on the deck plate. This photosensor device generates a reference voltage proportional to the angular position of the tension arm. Its signal activates the reel servo amplifier to maintain proper tape tension and reel servo speed.

- **Control logic.** All motion control logic is contained on a single printed circuit board assembly.
- **Power and servo control.** The reel servo amplifier and power supply regulator are contained on one printed circuit board assembly. Connections to and from the printed circuit board assembly are through interconnect plugs enhancing serviceability and ease of replacement. Multi-board spares are virtually eliminated in addition to the numerous connectors

required when using smaller printed circuit board assemblies.

The Pertec objective is to minimize interconnections with their inherent unreliability by laying out critical signal paths and coupling functional circuitry on a large printed circuit board.

Pertec's exclusive "Edit" capability is now a standard feature on all 5000-Series transports. The critical turn-on and turn-off of the write and erase current to prevent spurious signals is controlled by this feature enabling the rewriting of selective records. This is a basic requirement in many data entry applications for achieving record update or correction without leaving extraneous noise in the inter-record gap.

- **Data electronics.** Nine or seven full channels of read/write electronics are provided on one printed circuit board. For NRZI transports, write data is presented to the transport as nine or seven data lines plus a clock and likewise, the transport presents the equivalent read channels plus a clock to the controller interface.

In phase encoded versions, write data is presented to the transport via nine data lines with a double frequency clock line, and the read signals presented to the interface are nine distinct phase encoded waveforms. All input and output lines are TTL and DTL compatible incorporating ground true levels.

In the single gap head transport (Model 5X60), the emphasis in deskewing is placed on the precise alignment of the guides with relation to the head, therefore eliminating the use of adjustable single shots and providing an ideal transport from a service and tape interchangeability criteria.

In read-after-write, dual gap head versions of the transport (Model 5X40), electronic write deskew is provided through Pertec's unique digital deskewing technique where only one potentiometer adjustment is required at very infrequent intervals. When reading IBM compatible tapes, the emphasis in read deskew remains in the precise positioning of the head guides providing minimal skew in both forward and reverse directions.

Another innovation introduced by Pertec is "SKEW-SCAN" designed to reduce preventative maintenance and service time. With this feature, the serviceman can adjust the total channel skew while observing a single test point.

• Front Panel Switches/Indicators

ON	2	Selects and indicates address of transport.
OFF	←	Turns on and indicates AC power.
LOAD		Energizes servo and advances tape to load point.
ON LINE		Following load operation, sets transport to respond to external commands.
REWIND		Off-line function which causes reverse tape motion at nominal rewind speed.
WRTEN		Indicates when write enable ring is on supply reel.
HI DEN		Selects character packing density on those units designed for dual density (7 track and 9 track dual density transports).
RESET		Resets manual front panel operations selected.

AVAILABLE MODELS

The Pertec 5000-Series transports are available in six basic models — 5X40, 5X60, 5640-98, 5660-98, 5X11 and 5X12. A number of options are provided with each to meet any industry standard requirements. Table 1 outlines the basic model numbers and specific capabilities regarding speed, densities, and the number of tracks. Following Table 1 is a listing of optional features. All units are shipped with a set of input/output connectors and a comprehensive maintenance manual.

Model 5X60 Read/Write

Model 5X60 is a single-gap head unit available in 7- or 9-track NRZI, or 9-track phase-encoded. This model provides select capability and has appropriate input/output gating for multi-transport daisy-chain operation. Output data (NRZI) from a deskew register in the transport is clocked with the read data strobe to provide simultaneous pulses for a customer's controller. Available speeds are 12.5, 18.75, 25, and 37.5 ips. The transport includes motion and control electronics, read/write electronics, read/write head, power supply, and dust-sealed cover door.

Model 5X40 Read-After-Write

For read-after-write applications requiring 7 or

9-track NRZI or phase encoded capability, the Model 5X40 is available in speeds between 12.5 and 37.5 ips. The model uses a dual gap head with automatic multi-level read thresholds and has select capability and input/output gating for multi-transport daisy-chain operation. The basic transport includes motion and control electronics, read/write electronics, dual gap read-after-write head, power supply, and dust-sealed cover door.

Model 5X11/5X12 Read Only

For read only applications requiring 7 and/or 9-track NRZI and/or phase encoded capability, the Models 5X11 and 5X12 are available in speeds between 12.5 and 37.5 ips with two dual speed versions of 37.5/18.75 and 25/12.5 ips. The models use a single gap 7 or 9-track head or a dual gap 7 and 9-track head. The transport has select capability and input/output gating for multi-transport daisy-chain operation. The capability of threshold and timing margin selection provide the ability to read marginal tapes. The basic transport includes motion and control electronics, read only electronics, single gap 7 and/or 9-track head or dual 7 and 9-track head, power supply, and dust-sealed cover door.

TABLE 1

	MODEL NUMBER	NUMBER OF TRACKS	DATA DENSITY CPI	DATA TRANSFER RATE (KHz)			
				12.5 ips	18.75 ips	25 ips	37.5 ips
READ/WRITE	5860-9	9	800	10	15	20	30
	5860-75	7	800/556	10/6.95	15/10.43	20/13.9	30/20.9
	5860-72	7	800/200	10/2.5	15/3.75	20/5	30/7.5
	5560-72	7	556/200	6.95/2.5	10.43/3.75	13.9/5	20.9/7.5
	5660-9	9	1600	20	30	40	60
READ-AFTER-WRITE	5840-9	9	800	10	15	20	30
	5840-75	7	800/556	10/6.95	15/10.43	20/13.9	30/20.9
	5840-72	7	800/200	10/2.5	15/3.75	20/5	30/7.5
	5540-72	7	556/200	6.95/2.5	10.43/3.75	13.9/5	20.9/7.5
	5640-9	9	1600	20	30	40	60

Model Number	Number of Tracks	Data Density (cpi) 9-Track 7-Track	Data Transfer Rate (KHz) Higher Speed is always NRZI					37.5/18.75 ips	25/12.5 ips
			12.5 ips	18.75 ips	25 ips	37.5 ips			
5611-000-*	9	1600	20	30	40	60			
5611-800-*	9	1600/800	20/10	30/15	40/20	60/30	30/30	20/20	
5612-850-*	9	1600/800	20/10	30/15	40/20	60/30	30/30	20/20	
	7	800/556	10/6.95	15/10.4	20/13.9	30/20.8	30/20.8	20/13.9	
5612-820-*	9	1600/800	20/10	30/15	40/20	60/30	30/30	20/20	
	7	800/200	10/2.5	15/3.75	20/5	30/7.5	30/7.5	20/5	
5612-852-*	9	1600/800	20/10	30/15	40/20	60/30	30/30	20/20	
	7	556/200	6.95/2.5	10.4/3.75	13.9/5	20.8/7.5	20.8/7.5	13.9/5	
5811-000-*	9	800	10	15	20	30			
5811-500-*	7	800/556	10/6.95	15/10.4	20/13.9	30/20.8			
5811-200-*	7	800/200	10/2.5	15/3.75	20/5	30/7.5			
5511-200-*	7	556/200	6.95/2.5	10.4/3.75	13.9/5	20.8/7.5			
5812-500-*	9	800	10	15	20	30			
	7	800/556	10/6.95	15/10.4	20/13.9	30/20.8			
5812-200-*	9	800	10	15	20	30			
	7	800/200	10/2.5	15/3.75	20/5	30/7.5			
5812-520-*	9	800	10	15	20	30			
	7	556/200	6.95/2.5	10.4/3.75	13.9/5	20.8/7.5			

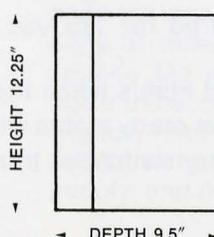
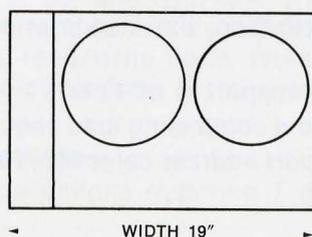
*Speed. Dash number is at head of each column.

OPTIONAL FEATURES which must be defined at the time of order are:

- **Color coordination panel.** An adhesive backed front panel providing the customer with the capability to coordinate the transport to his own color scheme. Pertec standard transport deck and door frame is sandblast aluminum finish with smoked-color acrylic door cover. Standard panel insert is pearl white.
- **Special speeds.** For speeds other than the standard 12.5, 18.75, 25, and 37.5 ips. consult with factory.
- **Customer logo.**
- **220 vac operation.** Normally wired for 115 vac operation, the customer may specify 220 vac for European version.
- **Status gating.** Provides transport status when the transport is off-line.
- **Transport ready.** Forces transport ready status without completing load sequence.
- **Select switch.** A 10-position rotary switch for transport address selection. Position 0 is off with position 1 through 4 being active.

SPECIFICATIONS

Data Density	9 Track — 1600 cpi Phase Encoded or 800 cpi NRZI 7 Track — 800, 556, 200 cpi NRZI
Tape Velocity	37.5, 25, 18.75, or 12.5 ips standard (dual speed available in read only configuration)
Instantaneous Speed Variation	±3%
Long Term Speed Variation	±1%
Start/Stop Displacement	0.19 inch ±0.02 (4.83 mm ±0.51)
Start/Stop Time	10.0 ms ±0.67 at 37.5 ips. Inversely proportional to tape speed
Number of Tracks	7 or 9, IBM compatible (Models 2400, 729, and others)
Recording Mode	NRZI, IBM compatible. Phase Encoded IBM and ANSI compatible
Inter-Channel Displacement Error	150 microinches (3.8) (max) at 1600 and 800 cpi 200 microinches (5.08 microns) (max) at 556 cpi
Tape Format	IBM compatible
Tape Specifications	0.5 inch (12.7 mm) wide. 1.5 mil (38.1 microns) thick. Computer grade
Tape Tension	8 ounces (226.7 grams)
Electronics	Silicon solid state and 930-Series DTL logic
Tape Unit Interface	DTL/TTL compatible logic (low true)
Rewind Speed	150 ips (nominal)
Reel Size	8½ inch
Weight	60 lbs. (27.2 Kg)
Power	117/230 v ac, 48 to 400 Hz, 250 watts (max)
Operating Temperature	35° to 122°F (2° to 50°C)
Relative Humidity	15 to 95% non-condensing
Altitude	0 to 20,000 feet
Mounting	Standard EIA rack mount
Dimensions	
Height	12.25 inches
Width	19 inches
Depth (behind panel)	9.5 inches



INTERFACE DESCRIPTION

The connection to all Pertec synchronous transports is through three interface connectors. The interface has been designed to allow multi-transport daisy-chain condition operation and, therefore, the true logic condition is set at ground level and false condition at +3 vdc. See interface circuits for appropriate drivers, receivers, and terminating resistors.

The input/output lines and their description is categorized into four functional groups as follows:

1. TRANSPORT CONTROL INPUTS.

SELECT (SLT). LEVEL, when true, remotely conditions transport and enables all input/output signals.

SYNCHRONOUS FORWARD COMMAND (SFC). LEVEL, when true, causes forward tape motion.

SYNCHRONOUS REVERSE COMMAND (SRC). LEVEL, when true, causes reverse tape motion.

REWIND COMMAND (RWC). PULSE, when true, initiates reverse tape motion at rewind speed.

OFF-LINE COMMAND (OFFC). PULSE, when true, causes tape transport to be placed under manual control.

SET WRITE STATUS (SWS). LEVEL, when true, 20 μ s after SFC conditions write current.

DATA DENSITY SELECT (DDS). LEVEL, when true, remotely selects high density in 7 track units.

OVERWRITE (OVW). LEVEL, when true, controls write and erase current turn-on and turn-off for selective record updating.

READ THRESHOLD 1 (RTH1). LEVEL, when true, selects high threshold when verifying a record on single gap systems. On read only versions, sets high timing margin.

READ THRESHOLD 2 (RTH2). LEVEL, when true, selects extra low threshold to recover very low amplitude data (not available on 5X40 and 5X60 transports).

2. TRANSPORT STATUS SIGNALS

READY (RDY). LEVEL, when true, indicates transport is on-line and not rewinding.

ON-LINE (ONLINE). LEVEL, when true, indicates tape unit is ready for on-line operation.

REWINDING (RWD). LEVEL, when true, indicates unit is in rewind cycle.

END OF TAPE (EOT). LEVEL, when true, indicates end of tape photo tab is being detected.

LOAD POINT (LDP). LEVEL, when true, indicates tape unit is at load point.

FILE PROTECT (FPT). LEVEL, when true, indicates a reel of tape with its write enable ring removed is loaded on tape unit.

DATA DENSITY INDICATOR (DDI). LEVEL, when true, indicates the selection of high density.

3. TRANSPORT DATA INPUTS

WRITE DATA STROBE (WDS). PULSE, when true, causes data on input lines to be recorded on tape. In phase encoded transports, two clocks are required per character to copy the waveform on tape.

WRITE AMPLIFIER RESET (WARS). PULSE, when true, generates LRC character on NRZI tape. In addition, it is used to signal current turn-off when in the edit mode.

DATA INPUTS (WDP, WD0-7). LEVELS, one input line for each track on tape. Used in conjunction with write clock to record data.

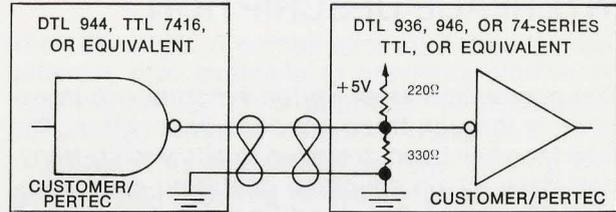
4. TRANSPORT DATA OUTPUTS

READ DATA STROBE (RDS). PULSE, when true, is used for clocking data lines out of transport (not available on Models 5660 and 5640).

READ DATA OUTPUT (RDP RD0-7). LEVELS, one line for each track of data on tape. Data is assembled in parallel form and clocked out of tape unit with read clock. In phase encoded, the output signal is a replica of the data input.

LEVELS: True = Low = 0 to 0.4V
 False = High = 3 v dc

PULSES: Amplitudes as above, 1 μ sec. typical
 width edge transmission delay over 20 feet of
 twisted cable is less than 200 nsec.



NOTES

PERTEC

Policy Note:

Pertec reserves the right to change specifications at any time. It is Pertec policy to improve products as new techniques and components become available.

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