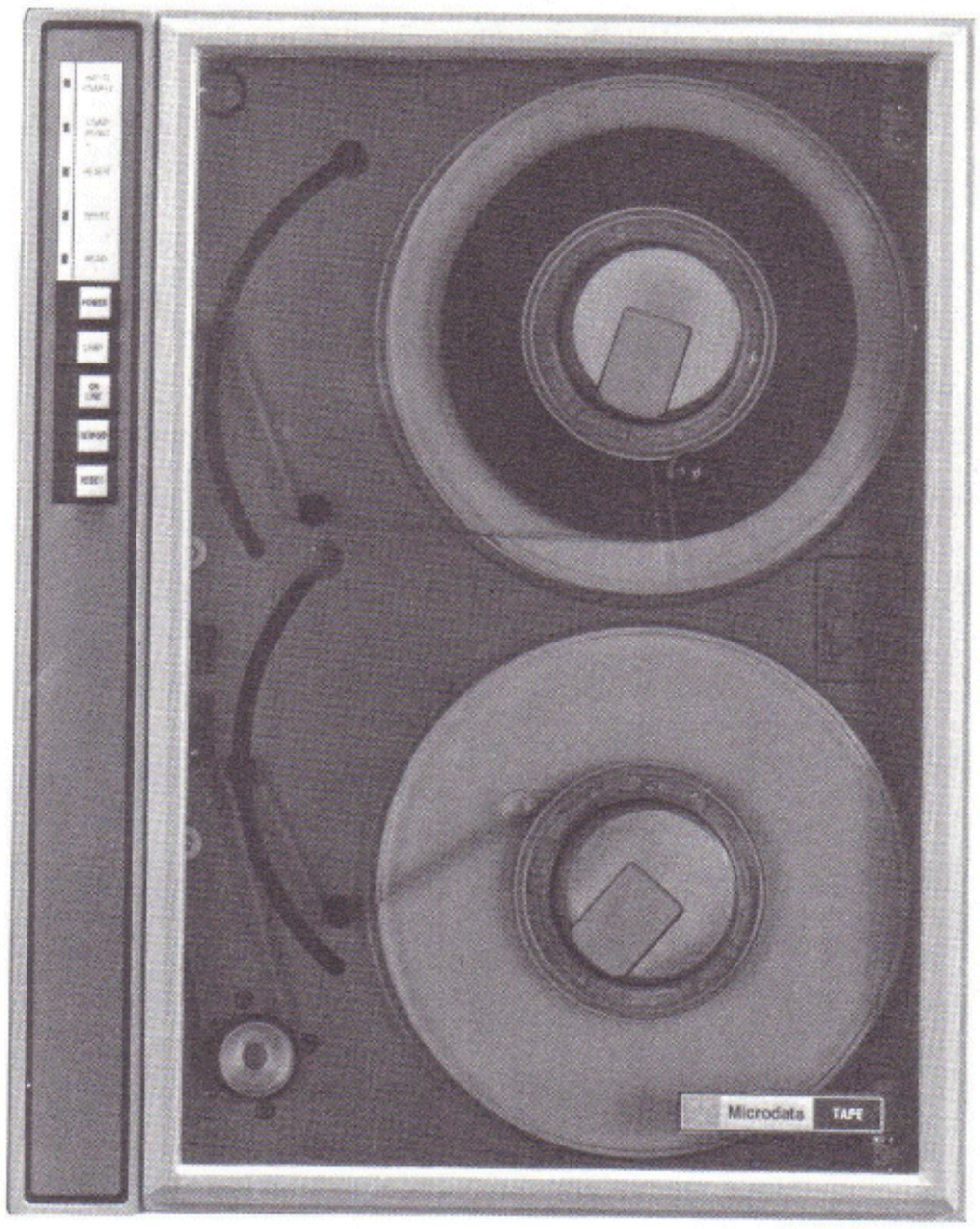
Microdata OEM Peripherals Group



Transport-Mounted Magnetic Tape Formatters

For use with the Microdata Series 6000 and 7000 Tape Transports, plus any other industry-standard magnetic tape units.

Model 6920

NRZI Formatter

Model 6922

Phase-Encoded (PE) Formatter for up to four tape transports.

Microdata Model 6920 and 6922 Magnetic Tape Formatters are industry-standard formatters compact enough for mounting within the tape drive, thereby eliminating the additional space and cost of separate rack mounting. Each formatter is capable of operating up to four daisychained MTUs.

Both the NRZI and PE formatters are designed to mount in and receive dc power from Microdata Series 6000 or 7000 Tape Transports. Since the formatters conform fully to accepted IBM standards for ½-inch tape operation, interfacing of any industry-standard MTU can be accomplished on the daisychain line. In large systems or small, these Microdata formatters can mean significant savings—in space and in dollars—through in-transport mounting, four-channel master/slave operation, and compatibility with the wide selection of industry-standard MTUs and controllers.

In-Transport Mounting. Compact enough to fit within the tape transport enclosure; eliminates separate formatter chassis and power supply. (Microdata Series 6000 and 7000 Tape Transports contain complete mounting and dc power provisions.)

Industry-Standard Specifications. Standard operation and interfacing means full compatibility with all industry-standard tape transports and controllers.

IBM Standard Tape Format. Records and reads NRZI or Phase-Encoded IBM-compatible ½-inch tapes.

Complete MTU Control. All tape motion operations, all read, write, erase and search functions; editing; clock, character and check character generation; MTU selection; error detection/correction; full buffering of data and MTU control signals.

Error Checking. PE formatter performs odd or even parity generation/checking, error detection and correction. NRZI formatter provides VRC, LRC and CRC error detection.

Model 6920
4-Channel NRZI Formatter

Microdata Model 6920 is a low-cost NRZI formatter capable of operating industry-standard NRZI tape transports. Efficiency of design and packaging has allowed this complete formatter to be contained on a single printed circuit board which mounts in a Microdata Series 6000 Tape Transport. Microdata achieved one-board packaging and low cost, while retaining all the capabilities normally required in today's NRZI tape storage systems.

Features and Capabilities

MTU Control Capability:	Model 6920 Formatter permits operation of MTUs from a single controller.
Recording Format:	NRZI (IBM compatible)
Tape Speed:	Adjustable to any speed from 25 to 45 ips
No. Tracks:	9
Tape Head:	Dual Gap
Tape Density:	800 BPI
Error Detection:	VRC generation/checking (parity) LRC checking CRC generation/checking (formatter initiates interrupt on detection of error)

Functional Description

Model 6920 Formatter contains all the logic and timing circuitry necessary for control of industry-standard NRZI magnetic tape transports, and for reading and writing IBM-compatible tapes.

MTU Control. Control logic in the formatter interprets controller commands and generates control signals to time, sequence and carry out the various MTU/formatter operations. Formatter control capabilities include: Tape Motion (forward, reverse, fast forward, rewind), Write Record, Read Record, Erase Record, File Mark Search, IRG Detect, Error Detection (VRC, CRC, LRC).

Interface Buffering. Read and write data, controller commands and formatter/MTU status signals are fully buffered by the formatter.

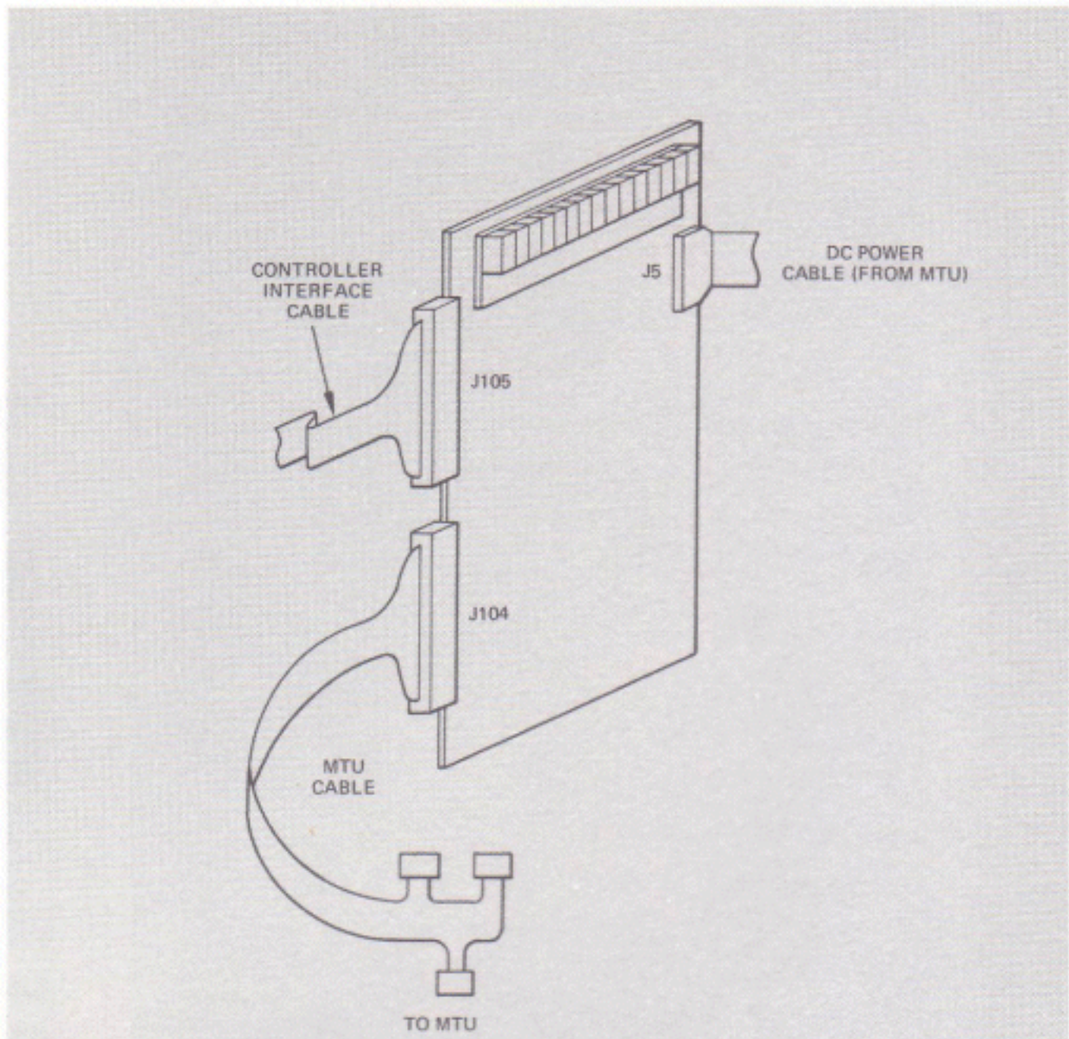
Clock and Character Generation. The formatter contains the necessary clocks to generate the timing signals for MTU operation and data recording. Formatter circuitry also performs all record formatting for write operations, and record detection during read operations.

Error Detection. VRC (parity), CRC and LRC characters are generated by the formatter for all write operations. During read operations, the formatter checks VRC, LRC and CRC, and initiates a computer interrupt for a detected error.

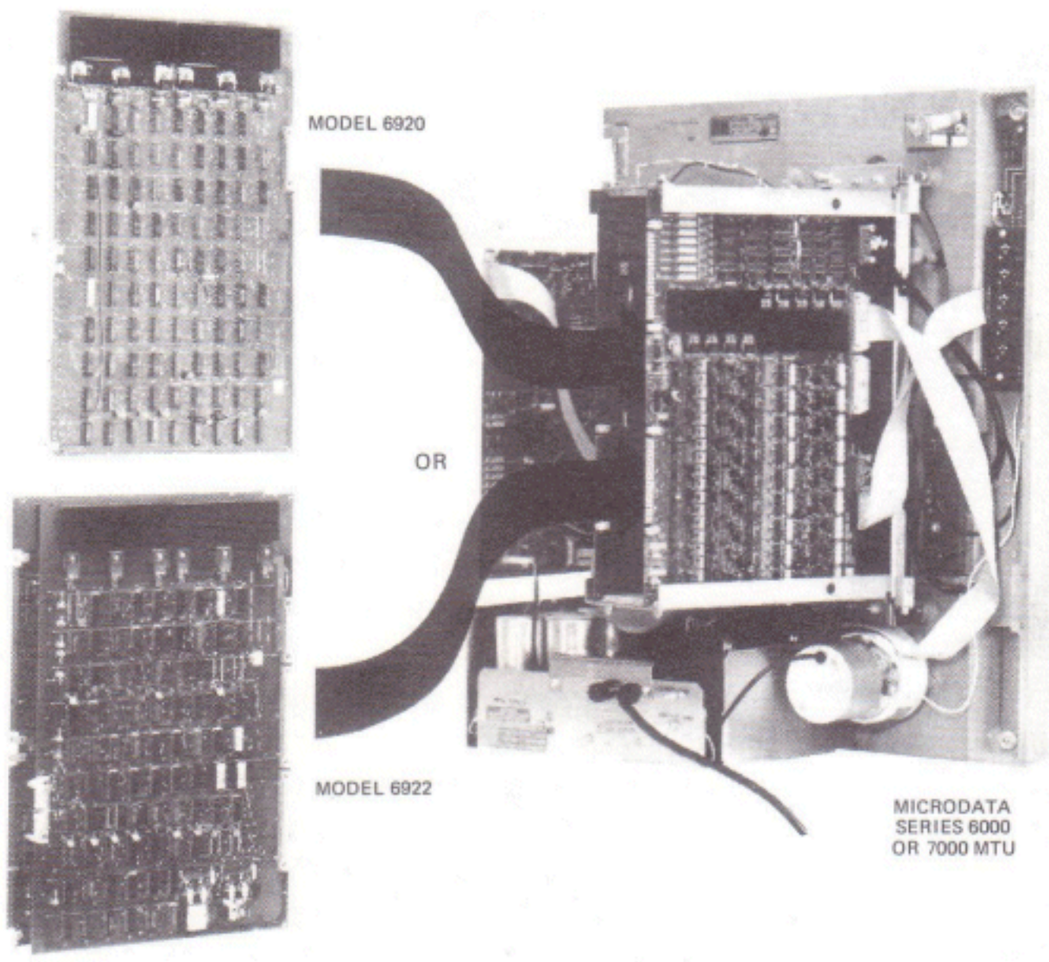
Status. The formatter provides complete MTU/formatter status to the controller.

Packaging and Interconnection

Model 6920 NRZI Formatter is fully contained on one 9¼" x 14" printed circuit board. The board is designed for mounting in one of the two available board positions in a Microdata Series 6000 Tape Transport. One 100-pin edge connector (J105) accepts the Controller Interface Cable; another identical edge connector (J104) accepts the MTU Cable. Formatter dc power is received from the MTU at 26-pin header connector J5. The dc Power Cable, Controller Interface Cable, and MTU Cable are available from Microdata.



Model 6920 NRZI Formatter installation in Microdata Magnetic Tape Transport



Model 6920 and Model 6922 Formatters are designed for mounting in Microdata Series 6000 and 7000 Magnetic Tape Transports

Model 6922
4-Channel PE Formatter

Model 6922 is a *full capability* four channel Phase-Encoded (PE) formatter designed to meet the needs of all PE recording applications. Features include the ability to mix MTUs with different head configurations and tape speeds, and formatter addressing which allows operation of two formatters from a single controller. Model 6922 is packaged on two printed circuit boards which mount in a Microdata Series 7000 Tape Transport.

Features and Capabilities

MTU Control Capability: Model 6922 Formatter permits operation of up to four MTUs.

Formatter Addressing: Formatter addressing capability allows use of two formatters (with up to eight MTUs total) per controller.

Recording Format: Phase-Encoded (IBM compatible)

Tape Speed: 25 ips

No. Tracks: 9

Tape Head: Single-Gap and Dual-Gap units may be mixed.

Tape Density: 1600 BPI

Error Detection: VRC generation/checking (parity)
PE error correction

Functional Description

Model 6922 Formatter contains all the logic and timing circuitry necessary for control of industry-standard PE magnetic tape transports, and for reading and writing IBM-compatible tapes.

Microprocessor Control. All PE formatter operations are initiated and monitored by a small microprocessor which uses a fixed set of instructions. The microprocessor generates gates, strobes and level changes which control the activities of the various registers, data circuits, control and status lines, etc. of the formatter.

Formatter Addressing. Two formatter address lines on the controller interface allow two PE formatters to be daisy-chained to a single controller.

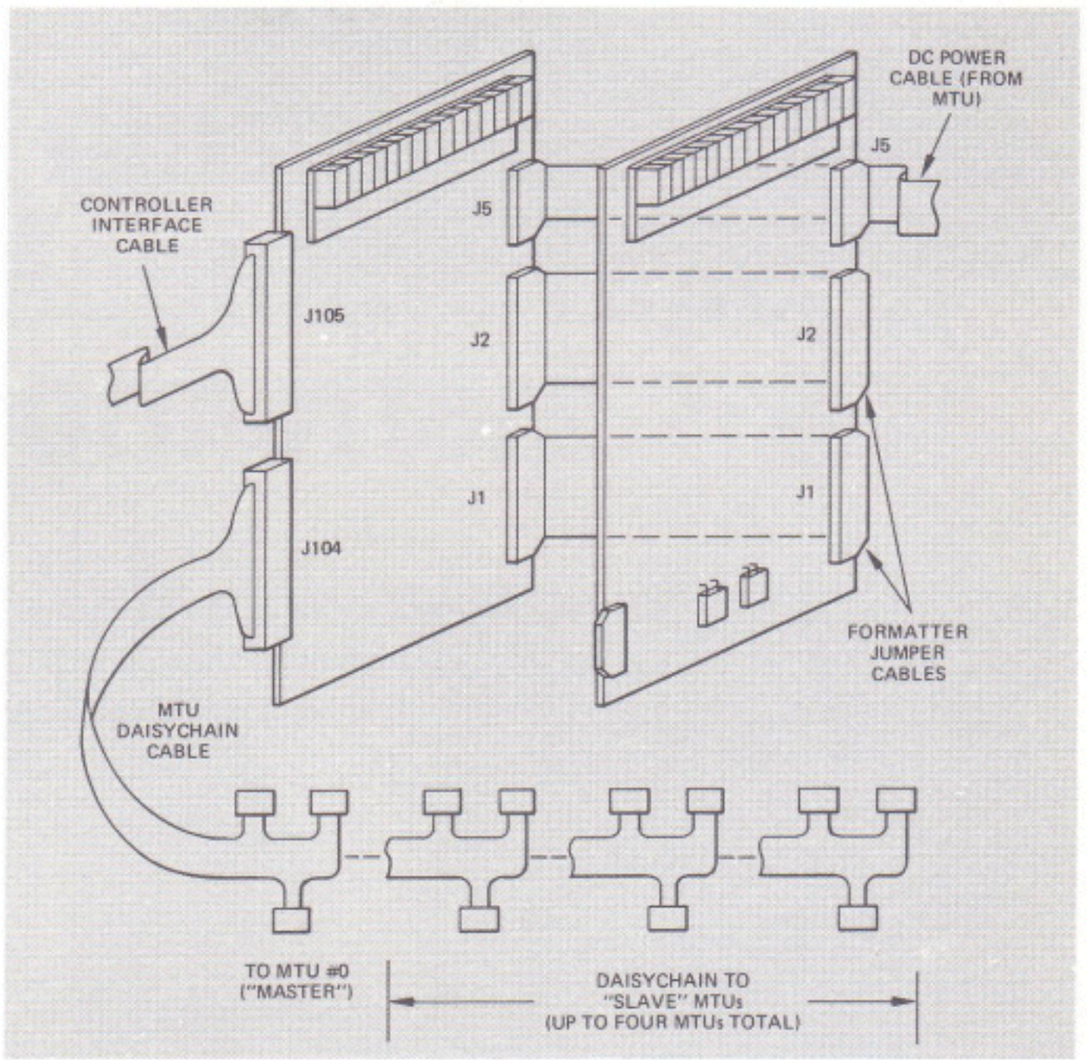
Head Selection. Head type (single- or dual-gap) can be selected manually by switches on the formatter, or automatically by status lines from the MTUs.

Error Detection/Correction. VRC (parity) is generated by the formatter for all write operations and checked during all read operations. In addition, PE error detection and correction is performed. A "soft error" status line notifies the controller that the data contains a corrected error; a "hard error" (one that could not be reconstructed) initiates a controller interrupt.

Other Functions. All other major functions of the PE formatter are identical (so far as the external interfaces are concerned) to the Microdata NRZI Formatter discussed on the preceding page. Model 6922 provides complete PE character generation/record formatting, and affords all the same MTU Control, Interface Buffering, Status Lines and industry-standard interface as the NRZI Formatter Model 6920.

Packaging and Interconnection

Model 6922 Phase-Encoded Formatter is contained on two 9¼" x 14" printed circuit boards designed for mounting in the two available board positions in a Microdata Series 7000 Tape Transport. The boards are connected to one another by two jumper cables (supplied) at connectors J1 and J2. Dc power is received from the "master" MTU at connector J5 on both boards. A 100-pin edge connector (J105) accepts the Controller Interface Cable; another identical edge connector (J104) accepts the MTU Daisychain Cable. The Dc Power Cable, Controller Interface Cable, and MTU Daisychain Cable (for 1, 2, 3 or 4 transports) are available from Microdata.

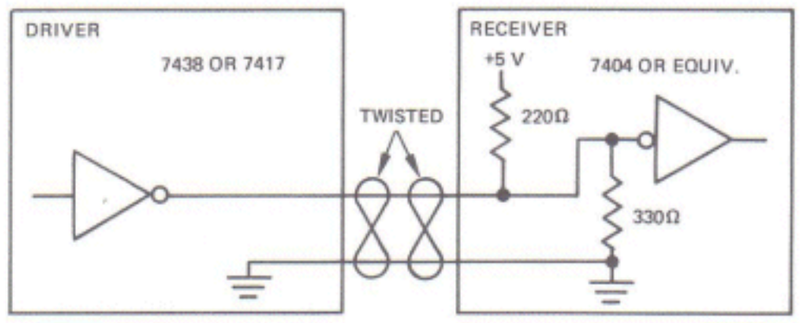


Model 6922 PE Formatter installation in Microdata Magnetic Tape Transport

INTERFACE SPECIFICATIONS
Models 6920 and 6922

Logic Levels (external): +3V = False (unasserted)
0V = True (asserted)

Interface Cable Connectors: (Controller Interface Cable and MTU Daisychain Cable): Viking 3VH50-1JV-5 (or equivalent)



Electrical Interface

Formatter Interface

Model 6920/Model 6922

Controller Interface Connector (J105)

Signal Name	Signal Pin	Ground Pin
TRANSPORT ADDRESS 0	A1	A2
* FORMATTER ADDRESS	B1	B2
INITIATE	A3	A2
TRANSPORT ADDRESS 1	B3	B2
WRITE/READ	A4	A5
REVERSE/FORWARD	B4	B5
* EDIT	A6	A5
WRITE FILE MARK	B6	B5
* ERASE	B7	B8
LOW READ THRESHOLD	B9	B8
* OFF LINE	A12	A11
REWIND	B12	B11
FORMATTER ENABLE	A13	A14
LAST BYTE	B13	B14
FAST	A46	B47
WRITE PARITY	A15	A14
WRITE 1	A16	A17
WRITE 0	B16	B17
WRITE 3	A18	A17
WRITE 2	B18	B17
WRITE 5	A19	A20
WRITE 4	B19	B20
WRITE 7	A21	A20
WRITE 6	B21	B20

MTU Daisychain Connector (J104)

Signal Name	Signal Pin	Ground Pin
TAPE WRITE STROBE (Data Ready)	B15	B14
WRITE DONE RESET (PE) LRC RESET (NRZI)	B16	B17
THRESHOLD SELECT 2	A18	A17
WRITE DATA PARITY	A21	A20
WRITE DATA 1	A22	A23
WRITE DATA 0	B22	B23
WRITE DATA 3	A24	A23
WRITE DATA 2	B24	B23
WRITE DATA 5	A25	A26
WRITE DATA 4	B25	B26
WRITE DATA 7	A27	A26
WRITE DATA 6	B27	B26
* OVERWRITE	A28	A29
FORWARD	B30	B29
REVERSE	B31	B32
REWIND	B33	B32
* OFF LINE	A34	A35
SET WRITE STATUS	B34	B35
* SELECT 1	A42	A41
* SELECT 0	B42	B41
* SELECT 3	A43	A44
* SELECT 2	B43	B44
FAST	A46	A47
* +5 VOLTS	B48	A48
* +5 VOLTS	B49	A49
* +5 VOLTS	B50	A50

FORMATTER

Signal Name	Signal Pin	Ground Pin
* DATA BUSY	A22	A23
FORMATTER BUSY	B22	B23
HARD ERROR/NRZI READ ERROR	A24	A23
* IDENTIFICATION BURST	B24	B23
FILE MARK	A25	A26
* SOFT ERROR	B25	B26
* ON LINE	A27	A26
READY	B27	B26
FILE PROTECT	A28	A29
REWINDING	B28	B29
END OF TAPE	A30	A29
LOAD POINT	B30	B29
* NRZI OUT	A31	A32
* SINGLE-GAP OUT	A33	A32
WRITE STROBE	A34	A35
LOW SPEED	B34	B35
READ PARITY	A36	A35
READ STROBE	B36	B35
READ 1	A37	A38
READ 0	B37	B38
READ 3	A39	A38
READ 2	B39	B38
READ 5	A40	A41
READ 4	B40	B41
READ 7	A42	A41
READ 6	B42	B41
* +5 VOLTS	B48	A48
* +5 VOLTS	B49	A49
* +5 VOLTS	B50	A50

Signal Name	Signal Pin	Ground Pin
READ DATA PARITY	B1	B2
READ DATA 1	A3	A2
READ DATA 0	B3	B2
READ DATA 2	A6	A5
* NRZI IN	A7	A8
READ DATA 3	B7	B8
* SINGLE-GAP IN	A9	A8
READ DATA 4	A10	A11
* LOW SPEED	B10	B11
READ DATA 5	B12	B11
READ DATA 7	A13	A14
READ DATA 6	B13	B14
REWIND STATUS	A36	A35
* ON-LINE STATUS	B36	B35
LOAD POINT STATUS	A37	A38
FILE PROTECT STATUS	B37	B38
READY STATUS	A39	A38
END-OF-TAPE STATUS	B40	B41

**Not used in Model 6920 NRZI Formatter*

™ Microdata

Microdata Corporation
17481 Red Hill Avenue
Irvine, California 92705
(714) 540-6730 TWX: 910-595-1764