



W WANGCO
INCORPORATED

NRZI/PE

MAGNETIC TAPE FORMATTER



NRZI/PE

The WANGCO Magnetic Tape Formatter contains all the necessary logic for reading and writing IBM-compatible 1600 cpi phase-encoded (PE), or NRZI magnetic tape or both. The assembly, which requires only 5¼ inches of vertical panel space is completely modular in design. It can contain either (1) One PE Formatter or, (2) two NRZI formatters, or (3) one NRZI formatter and one PE formatter. Each formatter can control up to four tape drives.

Either formatter contains logic that provides status information for the computer or special-purpose device. Additionally, either formatter provides for:

- 1) All timing necessary for the generation of IBM-compatible interblock gaps and correct head positioning between records.
- 2) Compatibility with tape drives having either single- or dual-gap heads.
- 3) Provision for fixed length erase commands.
- 4) Special commands for editing previously recorded data.

PE Formatters

The PE formatter contains all the logic for the generation of preamble, postamble, identification burst, phase-encoded data, and file mark patterns for recording. The read logic includes provision for the complete recovery of read data, including identification burst detection, preamble and postamble detection and stripping, data decoding, buffering, error and file mark detection, and error correction.

Each PE formatter can control tape drives of any two selected speeds; there can be read-only, write only, read/write, or read-after-write type tape drives.

NRZI Formatters

The NRZI formatter generates cyclic redundancy check characters, vertical parity characters, longitudinal redundancy check characters, and file mark characters. The formatter checks longitudinal and vertical parity, detects file marks, and contains data buffer registers.

Each NRZI formatter can control 7- and/or 9-track tape drives of any two selected densities and tape speeds. Two NRZI formatters may be combined to control eight tape drives from one computer input/output channel. Tape drives may be read-only, write-only, read/write, or read-after-write tape drives with a speed range from 12.5 to 75 inches per second.

Formatter Operation

The formatter accepts data and commands from an external device and provides data and status information to an external device. When a command is received from an external device, the formatter becomes busy and internally performs all the timing and control operations required to execute the command. Errors occurring during a command are available to the external device. On completion of a specific command, the formatter signals the external device and becomes not busy, to allow a successive command to be issued.

The computer adapter interface is standardized for both formatters such that **two** formatters can be daisy-chained to **one** computer adapter and addressed one at a time by the computer adapter. This provides the capability of mixing 1600 cpi and NRZI tape transports on the **same** computer port.

Read

Read data is transferred character by character from the tape drive to the formatter. The formatter separates the data and check characters, performs any required error checks, and re-transmits the data to the external device. Buffer registers are included in the formatter to hold the data between successive read strobes.

Write

Data transfers between the formatter and the tape drive are on a character basis, so the transfer rate is a function of tape speed and packing density. A write register is provided to hold the data between successive write requests. A status bit is provided to inform the computer of a transfer timing error.

Gap Generation

The formatter contains a crystal-controlled divider chain that generates the required gaps for both the 7- and 9-channel tape formats, either NRZI or PE.

A file mark command causes the formatter to automatically generate appropriate file marks on tape. File marks can automatically have either a 3-inch gap erased before the file mark or a normal inter-record gap. During read operations, the formatter tests for the presence of a file mark, and, when it is detected, generates a status bit to the controller.

Parity

The formatter generates odd parity for 9-track tape operation. For 7-track tape operation, data parity may be either even or odd, selected by software, although provision is made to override parity selection via front panel switches. The parity is checked during reading to verify proper parity. This includes a vertical parity check on each character and a longitudinal parity check at the end of a record.

Density

The density for 9-track tape operation is 800 cpi in NRZI form and 1600 cpi in phase-encoded form. For 7-track operation, the formatter performs data transfers at any two of three possible packing densities. Density selections, either 800, 556, or 200 cpi, are made via software but can be overridden for the selected transport by front panel switches.

BCD 0 to BCD 10 Conversion

In the 7-channel BCD (even parity) mode, an all-zeroes character is not valid. In this mode, the formatter detects the presence of all zeroes from the external device and automatically substitutes a BCD 10 character. When reading a BCD 10 character from tape, the formatter can be jumper-selected to revert to an all-zero character prior to input to the external device.

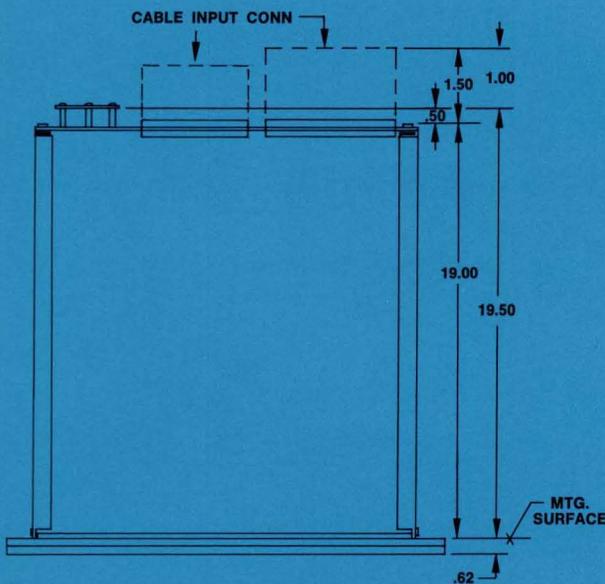
Power Requirements

110, 115, 120, 125 VAC, $\pm 10\%$ 1.5A, 48 to 62 Hz
220, 230, 240, 250 VAC, $\pm 10\%$.75A, 48 to 62 Hz

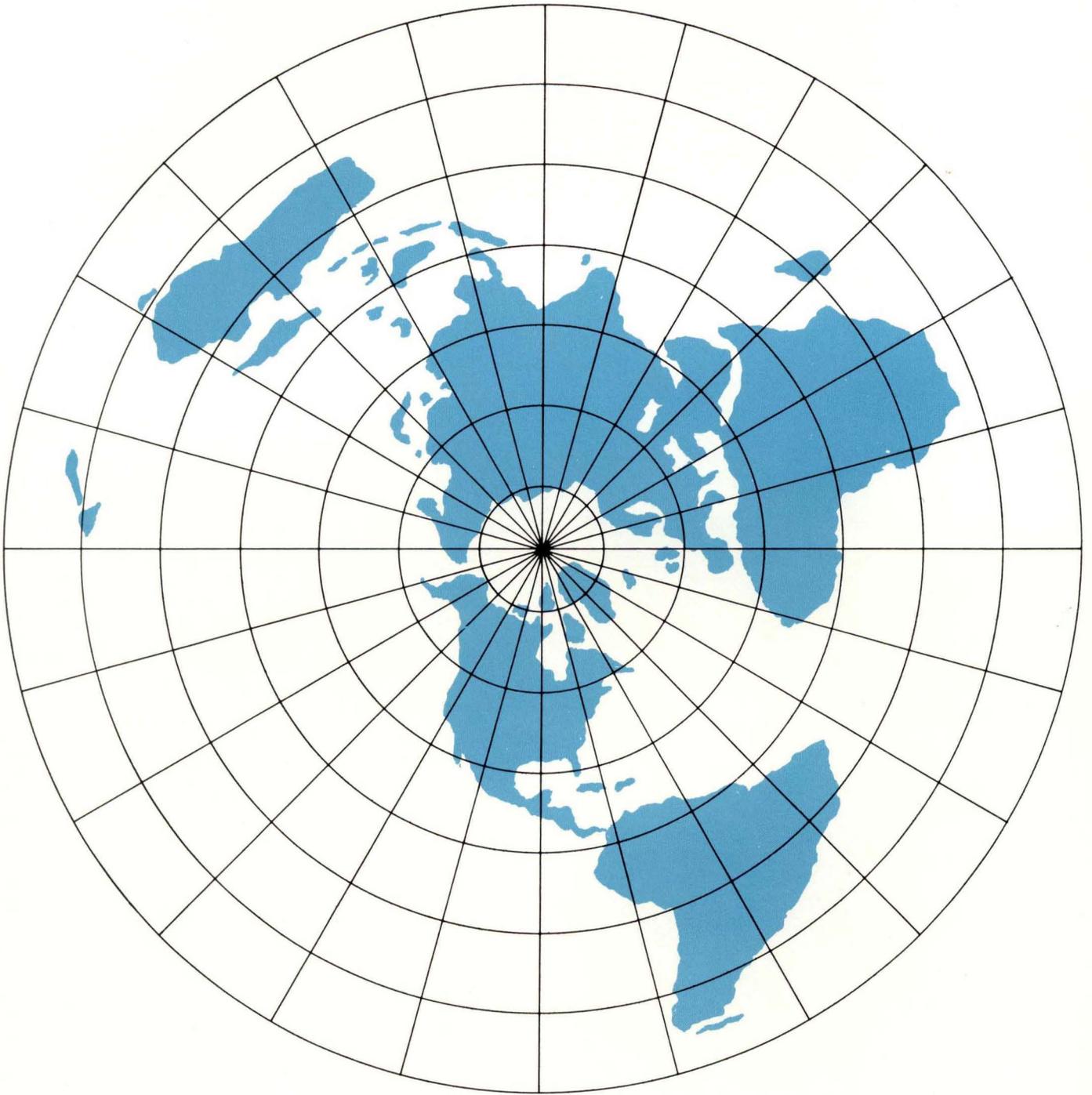
Environment

Operating: 0 to 50° C, 0 to 95% relative humidity

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WORLDWIDE SALES AND SERVICE FACILITIES



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