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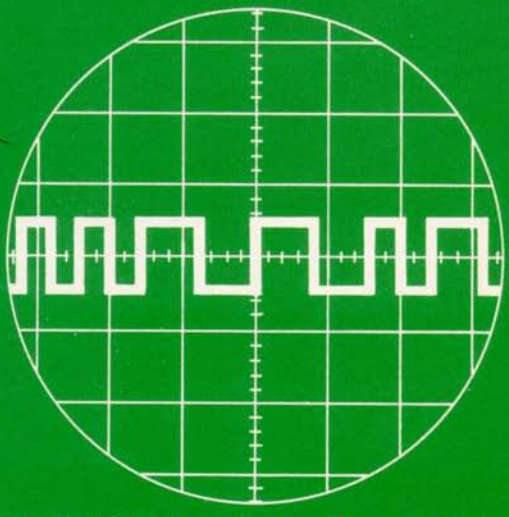
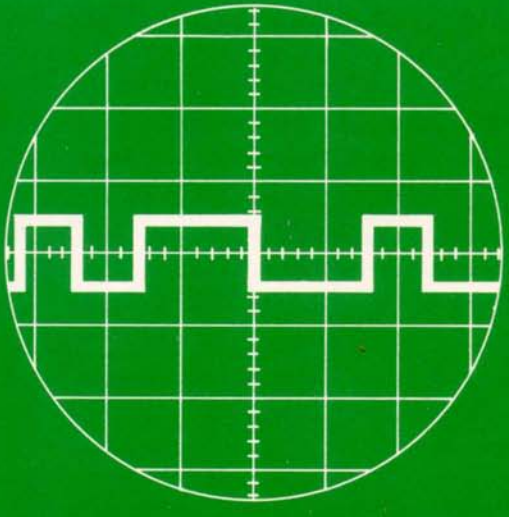


# IBM 2415 Magnetic Tape Unit and Control for System/360



field engineering announcement

# 2415 360

The IBM 2415 MAGNETIC TAPE UNIT AND CONTROL is designed to meet the low-cost tape requirements of the System/360 Models 20, 30, 40, 50, 65, and 75. The unit includes a single-channel, read or write, control unit which attaches to an Input/Output channel and the standard System/360 Interface.

The tape format and programming for the 2415 is compatible with the present 2401, 2402, and 2403 Magnetic Tape Units.

The 2415 uses standard ½-inch tape. Eight data tracks are used to record the information on tape, and a ninth track is used for parity bit checking.

The 2415 is available with either NRZI or Phase Encoding (PE). The phase encoding models may contain NRZI as an optional feature. The following six models are available:

| NRZI | PE | Description |
|---|---|---|
| Model 1 | Model 4 | One control unit and two tape units. |
| Model 2 | Model 5 | One control unit and four tape units. |
| Model 3 | Model 6 | One control unit and six tape units. |

*NRZI Models*

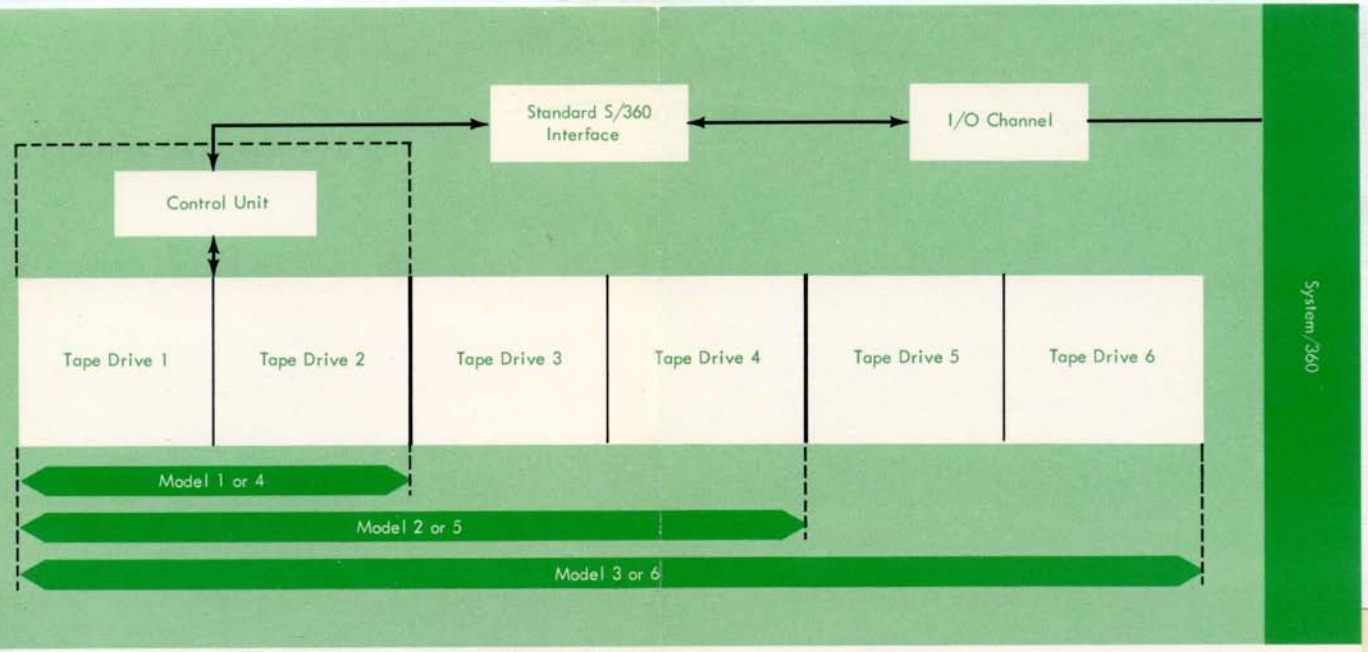
*Seven-Track (Optional):* The seven-track special feature allows compatibility with 729 and 7330 Magnetic Tape Units and provides for reading densities of 200, 556, and 800 bytes per inch with an IRG of 0.75 inch.

*Error Correction:* The cyclic redundancy check character is recorded to maintain 2400-series tape compatibility. Drives are not capable of error correction during read operation and conventional error recovery routines apply.

*Data Conversion (Optional):* For machines with seven-track compatibility, data conversion provides the ability to write three 8-bit bytes as four 6-bit tape characters. Four 6-bit tape characters are read as three 8-bit bytes. The data converter is program-controlled, but data conversion cannot be used on a read backward operation.

*Phase Encoded Models*

*NRZI (Optional):* Models 4, 5, and 6 are available with NRZI as a special feature to provide compatibility with the NRZI tapes. The seven-track and data conversion features are available with this feature.




## Characteristics

| | |
|---|---|
| Tape speed | 18.75 inches/sec. |
| Density | NRZI: 800 bytes/inch; PE: 1600 bytes/inch. |
| Byte rate | NRZI: 15,000 bytes/sec; PE: 30,000 bytes/sec. |
| IRG | 0.6 inches |
| IRG time | 32 ms (Best effective IRG time with maximum use of Early Start and Early Release is 17 ms) |
| Rewind time | 4.0 min. |

## Phase Encoding

Phase encoding records ones and zeros with flux changes of the opposite direction. A one is read as a positive pulse and a zero is read as a negative pulse.

Since either a one or a zero is recorded on every track, the absence of a pulse is not assumed to be a zero, but rather indicates an error.

Each record is preceded and followed by a burst of bits in all tracks. This burst of bits sets up the clocking rate for each track. This synchronizes the read circuits with the actual frequency of the bits on the track, and eliminates errors due to variations in speed and skew.

The read circuitry is designed to recognize only this burst as the beginning of a record and eliminates the possibility of the drive triggering itself because of noise pulses in the IRG.

The phase encoded models provide automatic error correction. When a given track first fails to respond with a pulse, this track is immediately disabled for the remainder of the record, and information bits are artificially produced to cause vertical parity to check out, providing automatic, in-flight, single-track error correction with no lost time. Backspacing and re-reading for correction is not necessary.

## Features

*Read Backward* operates the same as read except that tape is moved in a backward direction. The read backward is used by IBM Programming Systems in Sort and Assembly programs.

*Interface Checking:* Parity checking is employed on data and command inputs from the interface. Parity is assigned for sense and status outputs to the interface.

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