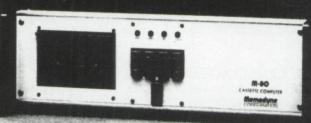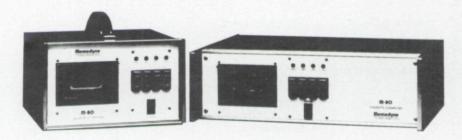**Memodyne** CORPORATION

INTELLIGENT DIGITAL CASSETTE RECORDING SYSTEMS

- Off-line data reduction and nonvolatile storage
- RS232C compatible computer storage peripheral
- Real time process control system
- Portable/mobile data gathering
- Airborne recording computer
- Automatic systems testing

INTELLIGENT DIGITAL CASSETTE RECORDING SYSTEMS

FEATURES:

Digital Cassette Recorder

- Reel driven, capstanless mechanism for gentle tape handling

- Rugged — designed to provide superior immunity to hostile environments

- High speed: Handles continuous data streams (Reads, writes, transmits and receives) at rates up to 9600 Baud

- Data Storage Capacity: Two tracks accessible on line, each capable of storing 238,000 bytes, formatted, on a standard cassette

- **ANSI/ECMA-34 compatible** in both encoding and formatting (Includes preamble, postamble, C.R.C., and up to 256 data characters per block) Writes and recognizes ANSI/ECMA tape marks

- **Texas Instruments (TI.) compatible:** Reads and writes cassettes compatible with Model 700 series terminals

- **MEMODYNE CNRZ encoding compatible:** Versions available to read all CNRZ- encoded tapes written on Memodyne incremental recorders

- **N.C.R. compatible:** Reads blocks sizes up to 511 bytes

- Auto error detection and retry capability

Computer

- Memodyne interrupt-driven firmware controls recorder and communication functions transparently in user programs

- 2.4576 MHz system clock

- 1K byte RAM, 2K optional

- 4K bytes of PROM

- Full 64K Z-80™ address space accessible via MEMOBUS™

- Accessory cards available for memory expansion within the M80 module: Model 406 8K static RAM board and Model 407 4K to 16K U.V.-EPROM board

- Four channel Integrating A/D Converter Card, Model 408, 12 bits plus sign

Front Panel Keypad

- Front panel keypad allows control of the M80 without a separate terminal and leaves serial ports completely open.

- M80 will accept and process keypad commands and user-generated RS232C data alternatively

- Two-level operation allows for simple control of recorder, while implementing the full M80 command repertoire

- Reliable bounce-free Hall-effect switches

- LED status indicators

- Internal selector switches for baud rate and serial communication format

SPECIFICATIONS:

Recording Media:	Philips Certified Digital Cassette, 300 feet, ANSI/ECMA compatible	Commands:	Tape On, Tape Off, X On, X Off, Rewind, Load Forward, Set Erase, Write File Gap, Transmit Status, Set Baud Rate, Set Block Size, Select Track, Execute User Program
Recording Head:	Read-While-Write, dual track		
Recording Density:	800 bits per inch		
Input/Output:	RS232C and TTY current loop	Power Requirements:	115 VAC ±10% 50-60 Hz, 220 VAC optional. Power consumption: Peak 80 watts max Average 50 watts
Data Transfer Rates:	110, 150, 300, 600, 1200, 2400, 4800, and 9600 baud		
Data Capacity:	250,000 bytes per track for total of 500,000 bytes — formatted	Operating Temperature:	0°C to +50°C
		Storage Temperature:	−35°C to +70°C
Data Format:	Phase encoded or CNRZ	Relative Humidity:	20 to 80%, no condensation
Block Size:	Selectable up to 256 bytes per block		
Interrecord Gap Length:	1.0 inches, nominal		

MECHANICAL DIMENSIONS

Tape speeds:	19.2 inches per second — Read and Write;100 inches per second — search and rewind	
Size:	in 2000 case	H 6⅝″ x W 10⅜″ x D 12″
	in 3000 case	H 5¼″ x W 17″ x D15″
Weight:	in 2000 case	16.1 lbs
	in 3000 case	18.6 lbs
System Clock Rate:	2.4576 MHz	
Error Rate:	Soft errors, 1 in 10^7 retried Hard errors are cassette dependent	

MODEL M80 SHOWN WITH
MODEL 403 INTERFACE
CARD AND MODEL 402 CPU CARD

GENERAL DESCRIPTION:

The M80/2000FPC and M80/3000FPC Systems combine a patented high-speed digital cassette recorder with a general purpose Z-80 based computer to perform a wide variety of tasks. The systems can operate as intelligent digital cassette recorders handling continuous data streams at rates up to 9600 baud, as standalone computers with a full 64K-byte, Z-80 memory capacity residing on an M80 Spare Card or, by combining the two preceding functions, as intelligent recording peripherals.

They may be used as straightforward laboratory computing recording instruments under local control, or remote, slaved peripherals in distributed processing applications. The systems have full-duplex modem and terminal RS-232C and TTY current-loop serial I/O ports for easy interfacing For maximum utility, the M80 recorder and communication functions operate under interrupt-driven control, enabling the systems to perform background tasks in support of the host computer or other peripherals on the bus. These tasks include transducer linearization routines, front-end data reduction and execution of external user programs.

The Models M80/2000FPC and M80/3000FPC consist of the following: The M80 transport and electronics module, a Model 411 control keypad, a triple-output linear power supply, all necessary power and signal cables, and either the 2000 style (portable) case or the 3000 style (rack mountable) case.

Modularity of the M80 system is made possible by the use of standard 50-pin and 60-pin ribbon cable and matching edge connectors. The 411 control keypad is connected via 60-pin ribbon cable to the M80 module bus extension. The M80's serial interface 403 card provides for RS232C compatible interfacing, brought out to the rear panel by a 50-pin ribbon cable with a pin-and-socket type connector on the 403 card, and two standard 25 pin connectors mounted on the rear panel, one for terminal type devices, and one for modem-type devices.

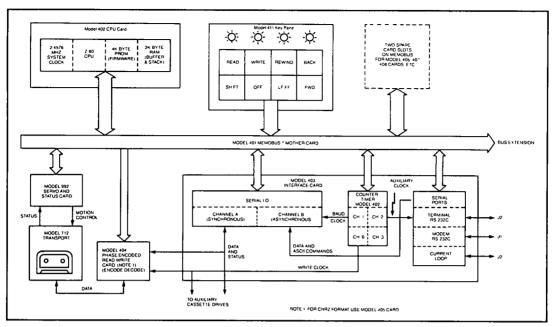The M80 system structure is illustrated in the "M80 Functional Block Diagram".

FRONT PANEL KEYPAD CONTROL

Eight keys and four light emitting diode (LED) indicators all serving multiple functions, constitute the front panel control. The Model 411 keypad generates a unique vectored interrupt for each keystroke, interfacing with the M80 firmware, which is augmented to implement control operations. The multi-function keypad provides a total of 28 keystrokes, four of which select either RECORDER MODE or COMMAND MODE operation. The remaining 24 keystrokes initiate assorted system functions, depending on the mode of operation. See Table 1.

	RECORDER MODE		COMMAND MODE	
KEY NAME	NO SHIFT	SHIFT	NO SHIFT	SHIFT
BACK	FILE REVERSE OR BLOCK REVERSE	SYSTEM RESET	1	
REWIND	REWIND	CLEAR COMMAND BUFFER	2	REVIEW KEY SEQUENCE
WRITE	TAPE-ON (RECEIVE AND WRITE)	FINISH WRITING OR WRITE FILE GAP	4	
READ	X-ON (READ AND TRANSMIT)	CLEAR DATA BUFFER	8	
OFF	X-OFF, TAPE-OFF, AND HALT HIGH SPEED OPERATION		CLEAR (PREPARE FOR NEW COMMAND CODE)	RECORDER MODE
LF/FF	LOAD FORWARD OR FAST FORWARD	ERASE	EXECUTE	
FWD	FILE FORWARD OR BLOCK FORWARD	COMMAND MODE	ENTER DATA	

KEYSTROKE FUNCTION CHART
TABLE 1

M80 FUNCTIONAL BLOCK DIAGRAM

RECORDER MODE

The M80 powers up in the recorder mode, which gives the user direct control of tape motion and action. The keypad and indicator functions for the recorder control mode are illustrated in the first two columns of Table 1, and in Figure 1. Note that if the SHIFT key is held down, the other keys assume those functions represented in parentheses. (Figure 1)
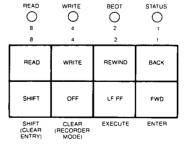
Tape motion and Read and Write operations are most easily controlled in the RECORDER mode.

Names of key functions invoked when the SHIFT key is held and of secondary representations by indicators are shown in parentheses

FIGURE 1

RECORDER MODE KEY-PANEL DIAGRAM

COMMAND MODE

A SHIFT-FORWARD keystroke enters the M80 system into the COMMAND MODE, which gives the user control of the computer itself and its related functions. The top row of keys become the hex-coded data or parameter keys 8, 4, 2 and 1, with the LED above each key indicating DATA STATUS; thus the READ, WRITE, REWIND and BACK keys of Fig. 2 enter in 8, 4, 2 and 1, respectively, and the LED above each key lights to indicate the ON state of its assigned bit.

The bottom row of keys assume those functions written under the keypad diagram in Fig. 2. The SHIFT key is used only for two functions in conjunction with other keys; these and all other keyboard functions are illustrated in the last two columns of Table 1.

The legends shown on the keys and just above the indicators in this diagram appear on the actual key panel but do not correspond to functions in the COMMAND MODE. Names of key functions invoked when the SHIFT key is held are shown in parentheses
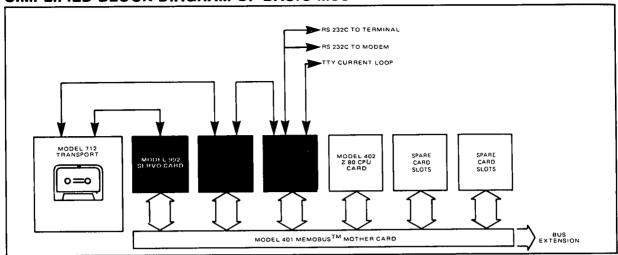
FIGURE 2

COMMAND MODE KEY-PANEL DIAGRAM

SIMPLIFIED BLOCK DIAGRAM OF BASIC M80

ORDERING INFORMATION:

When ordering an M80, we ask that you complete a questionnaire which details the firmware-selectable operation parameters; e.g. baud rate, block size, parity, etc. Although these parameters are all selectable via the keypad, it makes sense to have most of your requirements satisfied by custom firmware which Memodyne will prepare from your questionnaire. Separate forms are used for CNRZ and Phase-encoded formats.

Model M80/2000FPC	Cassette Computer System in 2000 Portable Case
Model M80/3000FPC	Cassette Computer System in 3000 Desk Top Case
	Add suffix "R" for rack mounting
	NOTE 1. For either model add suffix "E" for 220V AC operation (EG: M80/3000FPCRE)
	Note 2. Phase encoding or CNRZ should be specified on Questionnaire

CAS-2H — Certified Digital Cassette Recommended cassette is 300' long, has BEOT holes

Model 360 — Bulk Eraser

OTHER ACCESSORIES AND OPTIONS

With such a versatile recording system many accessories and/or optional cards, etc. are available. Here is a brief list. If interested please notify our nearest representative or consult with the factory.

Firmware listing – Cassette or paper

Firmware PROM Set

Source Program on Disk

Test tape – Phase Encoded

Test tape – CNRZ

Model 403 Card Modified for Transparent operations

Model 404 Phase Encoded Card
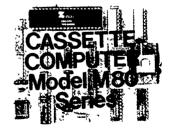
Model 405 CNRZ Card

Model 406 8K Static RAM Card

Model 407 4K to 16K U.V. EPROM Card

Model 408 4 channel, 12 Bit plus sign A/D Converter Card

Model 351 Rack Mounting ears for 3000 Case

CORPORATION
220 Reservoir Street
Needham Hgts., MA 02194
Tel. (617) 444-7000 Telex 92-2537

M80/FPC 20KB12