

## SCOPE

This hardware specification provides a description for the TEAC FF-3010/700, Combo drive. The FF-3010/700 has two drives in the size of a conventional 41mm height 5.25-inch drive, one is 1-inch height floppy tape drive and the other is 0.5 inch height 3.5-inch floppy disk drive (2MB/1.6MB/1MB three-mode).

## OUTLINE

Table 1 through 3 show the outline of the FF-3010/700, the floppy tape drive and the 3.5-inch floppy disk drive.

(Table 1) Specification outline

Model name	FF-3010/700
Safety standard	UL, CSA, IEC950 (CB)
Front bezel and flap	Light gray (PS)
Eject button	Light gray (PS)
LED indicator color	Green

(Table 2) Floppy tape drive specification outline

Tape used (mini data cartridge)	Uses the mini data cartridge specified in QIC-143. (Refer to item 3 for the details) Ref. 1. Coercivity : 900Oe (72,000A/m) 2. Width : 0.247 ± 0.0005in (6.27 ± 0.013mm) 3. Length : 400ft (121.9m)
Recording format	QIC-3010-MC
Readable format	QIC-3010-MC/QIC-80
Recording density	22,125ftpi
Data density	22,125bpi
Formatted data capacity	Approx. 345.6MB (approx. 691.2MB when data is compressed by a factor of 50%)
Power supplies	+5V DC, +12V DC
Interface	In compliance with QIC-107 (alias FDD interface)
Drive select setting	SOFTWARE PHANTOM SELECT 0 at factory-preset
Terminator	1kΩ, unremovable

(Table 3) 3.5" floppy disk drive specification outline

Operation modes (unformatted capacity)	2MB mode Write/Read	1.6MB mode Write/Read	1MB mode Write/Read
3.5" disk used	2HD		2DD
Data transfer rate	500k bits/sec		250k bits/sec
Disk rotational speed	300rpm	360rpm	300rpm
Track density	135tpi		
Track to track time	3msec		
Required power	+5V DC		
Signal output driver	Open collector TTL		
Input signal terminator	1k $\Omega$ unremovable		
Function setting at delivery	1. Strap setting DS1: DRIVE SELECT 1 on pin 12 DC34: DISK CHANGE on pin 34 2. Other function setting LED turn-on condition : DRIVE SELECT * Ready state Motor rotating condition : MOTOR ON Ready and seek-complete gate (full-mask) for INDEX and READ DATA output pulses. Pin 2: OPEN (1.6M2 strap OFF, 2MB/1MB mode at delivery) Pin 4: OPEN(1.6M2 strap OFF, 2MB/1MB mode at delivery) (HO4 strap OFF) Pin 10: OPEN (DS0 strap OFF) Auto-recalibration: Equipped Auto-chucking: Not equipped Density mode setting : Automatic setting by detecting HD hole of an installed disk		
Interface connector	34 pin right angle header connector and power connector		
Other optional function	Not equipped		

Notes: 1. The 3.5" floppy disk drive is equipped with a discrimination for the high density (HD) hole of a disk and the 1.6MB IN input signal (will become valid when either the 1.6M2 or 1.6M4 strap is set to ON) for designating the density mode. When a normal density disk (2DD) is installed, the floppy disk drive automatically set to the 1MB mode, while the floppy disk drive is set to the 2MB mode or 1.6MB mode according to the 1.6MB IN signal when a high density disk (2HD) is installed.

2. Disk

3.5" floppy disks which are mutually agreed between the customer and TEAC.

For 1MB mode: Normal density disk (2DD)

1.6MB and 2MB mode: High density disk (2HD)

## **STRUCTURE**

### **External Structure**

#### **(1) Dimensions**

(a) Height : 41.3mm (1.626 in), typ.

(b) Width : 146mm (5.748 in), typ.

(c) Depth : 193mm (7.598 in), typ.

Note: With (a) to (c), the front bezel is not included.

(2) Weight : 870g (1.92 lbs), typ.

(3) External view: Refer to Fig.1.

### **Installation (Mini Data Cartridge)**

(1) Direction of installation: as described below.

(a) The cartridge may be inserted horizontally from the front. However, the orientation with the indicator positioned on the right side is not permitted

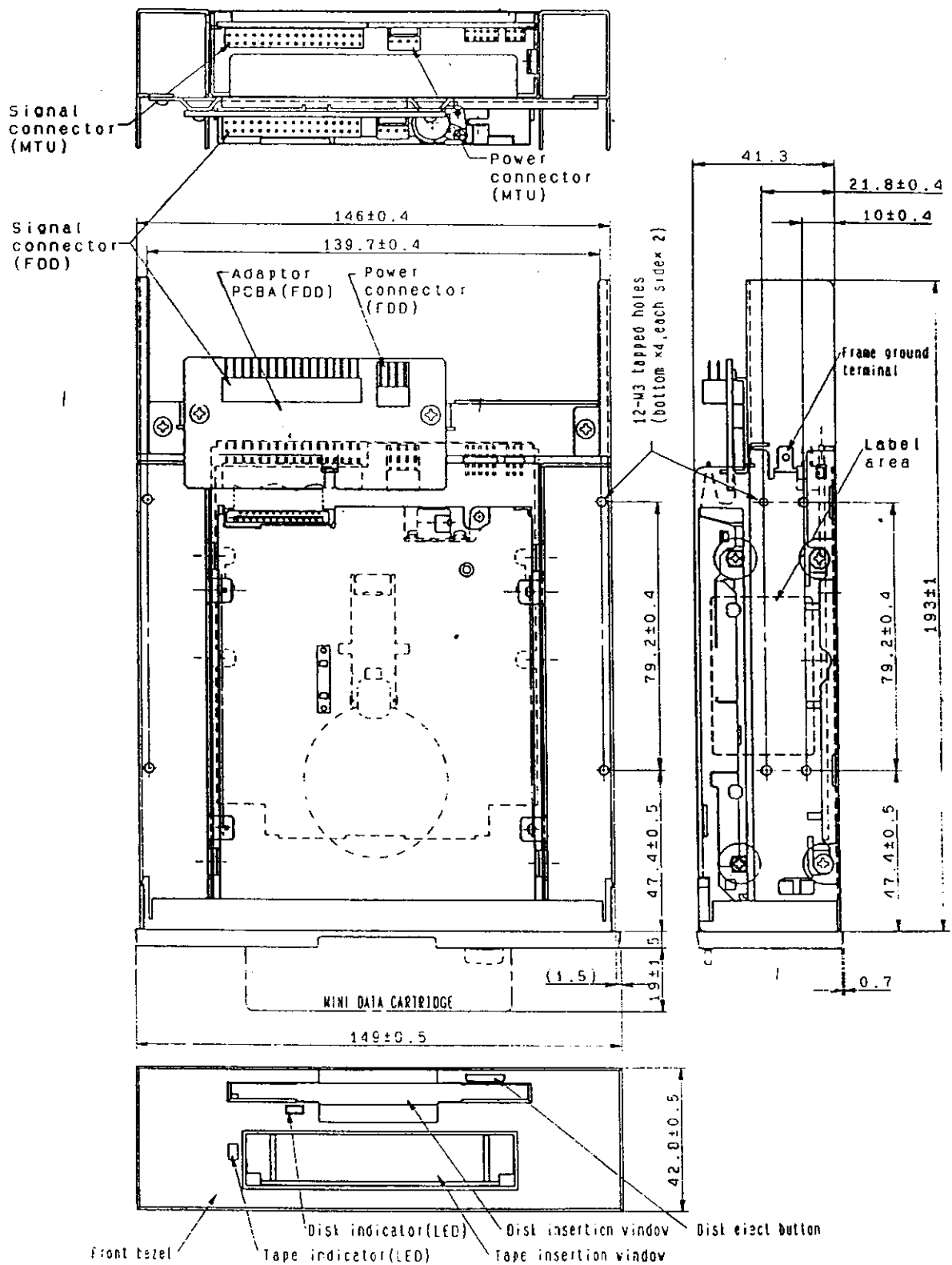
(b) The cartridge may be inserted vertically from the front.

(c) In case of (a) and (b), the front side can be tilted to upward or down-ward maximum 15 degrees.

(2) Mounting method: The drive is mounted with screws through the mounting holes at the sides and bottom.

Refer to Fig.1 for the positions of the mounting holes.

Note: When mounting the drive with screws, use a tightening torque of 4kg·cm (55.5oz·in) or less.



(UNIT: mm)

(Fig.1) External view of the unit

## ENVIRONMENTAL CONDITIONS

The environmental conditions mentioned in this section are for the drive without a tape and a disk. The environmental conditions of the tape and the disk should comply with the standards specified for the applicable tape and disk.

### (1) Ambient temperature

- (a) Operating : 10 ~ 45°C (50 ~ 113°F)
- (b) Storage and transportation : - 22 ~ 60°C ( - 8 ~ 140°F)

### (2) Temperature gradient

- (a) Operating : 6°C (10.8°F) or less per hour (non-condensing)
- (b) Storage and transportation : 30°C (54°F) or less per hour (non-condensing)

### (3) Relative humidity

- (a) Operating : 20 ~ 80% (non-condensing)  
Max. wet bulb temperature; 26°C (79°F) or less
- (b) Storage : 10 ~ 90% (non-condensing)  
Max. wet bulb temperature; 40°C (104°F) or less
- (c) Transportation : 10 ~ 90% (non-condensing)  
Max. wet bulb temperature; 45°C (113°F) or less

### (4) Vibrations

- (a) Operating : 1.0G or less (10 ~ 100Hz, sweeps at 1 oct/min.)  
: 0.5G or less (100 ~ 600Hz, sweeps at 1 oct/min.)
- (b) Storage and transportation : 1.5G or less (10 ~ 100Hz, sweeps at 1/4 oct/min)

### (5) Shock

- (a) Operating : 5G or less (half-sine wave, 11msec)
- (b) Storage and transportation : 70G or less (half-sine wave, 11msec)

## RELIABILITY

### Floppy Tape Drive

- (1) Mean time between failures (MTBF) : 119,000 POH or more (for typical operating duty)
- (2) Mean time to repair (MTTR) : 20 minutes
- (3) Soft error : 1 or less per  $1 \times 10^7$  bits read
- (4) Hard error : 1 or less per  $1 \times 10^{14}$  bits read

### 3.5" Floppy Disk Drive

- (1) Mean time between failures (MTBF) : 30,000 POH or more (for typical operation duty)
- (2) Mean time to repair (MTTR) : 30 minutes
- (3) Disk life :  $3 \times 10^6$  passes/track or more
- (4) Disk insertion :  $1.5 \times 10^4$  times or more
- (5) Seek operation life :  $1 \times 10^7$  random seeks or more
- (6) Preventive maintenance : Not required (for typical operation duty)
- (7) Error rate

- (a) Soft error : 1 or less per  $1 \times 10^9$  bits read

A soft (recoverable) error is defined that it can be read correctly within three retries.

- (b) Hard error : 1 or less per  $1 \times 10^{12}$  bits read

A hard (unrecoverable) error is defined that it cannot be read correctly within three retries. However, it is recommended to be followed by a recalibration to track 00 and four additional retries.

- (c) Seek error : 1 or less per  $1 \times 10^6$  seeks

A seek error is defined that it can seek to a target track within one retry including a recalibration to track 00.

## DETAILS OF FLOPPY TAPE DRIVE SPECIFICATION

### Standards of Recording Format and Interface

This floppy tape drive (hereinafter, referred to as the MTU) complies with the following standards in order to be compatible with the recording format and interface.

(1) QIC-3010-MC

SERIAL RECORDED MAGNETIC TAPE MINICARTRIDGE FOR INFORMATION INTERCHANGE

(2) QIC-107

BASIC DRIVE INTERFACE FOR FLEXIBLE-DISK-CONTROLLER COMPATIBLE 1/4-INCH (6.35MM) MINICARTRIDGE TAPE DRIVES

(3) QIC-113

HOST INTERCHANGE FORMAT

(4) QIC-117

COMMON COMMAND SET INTERFACE SPECIFICATION FOR FLEXIBLE DISK CONTROLLER BASED MINICARTRIDGE TAPE DRIVES

### Tape Used (Mini Data Cartridge)

One mini data cartridge specified in QIC-143 should be used.

TEAC recommends the following tapes, which have been confirmed suitable for use with the MTU.

(1) Unformatted tape

3M : MC3000XL (400ft)

(2) Formatted tape

3M : MC3000XL PIMAT (400ft)

Note: If the above tapes are difficult to obtain, the following tape may also be used although its data capacity is a little smaller.

(a) Unformatted tape

3M : MC3000 (300ft)

(b) Formatted tape : not commercially available

### Drive Mechanism Construction

- (1) Tape drive system : DC brush-less motor
- (2) Motor/Roller\*1 transmission : Timing belt system
- (3) Cartridge loading/unloading system : Manual
- (4) Cartridge loading detector : Cartridge loading detection system by mechanical switch
- (5) File protect system : Detects the write inhibit status of a cartridge by mechanical switch
- (6) Marker detector : Photoelectric transmission system by LED and phototransistors
- (7) Magnetic head moving construction : Stepping motor and lead screw

Note: \*1 Roller means the drive roller with rubber which transmits the rotation of the motor to the cartridge.

### Recording Characteristics

- (1) Recording format : In compliance with QIC-3010-MC
- (2) Numbers of tracks (on tape) : 40
- (3) Encoding system : MFM
- (4) Recording form : Single track serpentine recording

- (5) Recording density : 22,125ftpi
- (6) Data density : 22,125bpi
- (7) ECC : Reed Solomon (3-order)
- (8) Data capacity per tape  
(at full write) : Approx. 345.6MB
- (9) Data capacity per track : Approx. 8.641MB
- (10) Number of segments per track : 291
- (11) Number of sectors per segment : Data 29, ECC 3
- (12) Number of data per sector : 1,024 bytes

Notes: 1. Data capacity when fully written is approx. 345.6MB, but approx. 691.2MB with a data compression factor of 50%.

2. Data capacity is under the following conditions.

- (a) Speed tolerance :  $\pm 0\%$
- (b) Number of defect (on tape) : 0

#### **Data Compatibility**

- (1) Write compatible : In compliance with QIC-3010
- (2) Read compatible : In compliance with QIC-3010/QIC-80

#### **Data Transfer Rate, Tape Drive Characteristics and Data Processing Time**

- (1) Data transfer rate : 500kbps and 1Mbps
- (2) Tape speed (QIC-3010 write/read) : 22.6ips (500kbps)  
45.2ips (1Mbps)
- (3) Tape speed (QIC-80 read) : 34ips (500kbps)  
68ips (1Mbps)
- (4) Rewinding time : Approx. 80ips
- (5) Long-term speed variation (LSV) :  $\pm 3\%$
- (6) Instantaneous speed variation (ISV) :  $\pm 6\%$
- (7) Data processing time (at 1Mbps) (for reference):
  - (a) Back-up time per tape : Approx. 76 min.
  - (b) Back-up speed (not compressed) : Approx. 4.8MB per min.
  - (c) Back-up speed (compressed) : Approx. 8MB per min.

Note: The data processing times are reference values based on actual measurements made at TEAC. Therefore, especially during data compression, values will differ according to content data and compression mode setting.

#### **Electrical Characteristics**

- (1) Signal interface
  - (a) Applicable standard : In compliance with QIC-107
  - (b) Driver/Receiver : Single-end type
  - (c) Input signal
    - ① Receiver : CMOS receiver with hysteresis
    - ② Signal level
      - Low level (true) : 0 ~ 0.8V DC
      - High level (false) : 2.0 ~ 5.25V DC
    - ③ Maximum load current : 0.5 $\mu$ A
    - ④ Minimum hysteresis width : 0.2V DC