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 dirve specification outline

Tape used (mini data cartridge)	Uses the mini data carrtridge specified in QIC-143. (Refer to item 3 for the details) Ref. 1. Coercivity : 900Oe (72,000A/m) 2. Width : 0.247 ± 0.0005*in* (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 dirver	Open collector TTL		
Input signal terminator	1kΩ 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

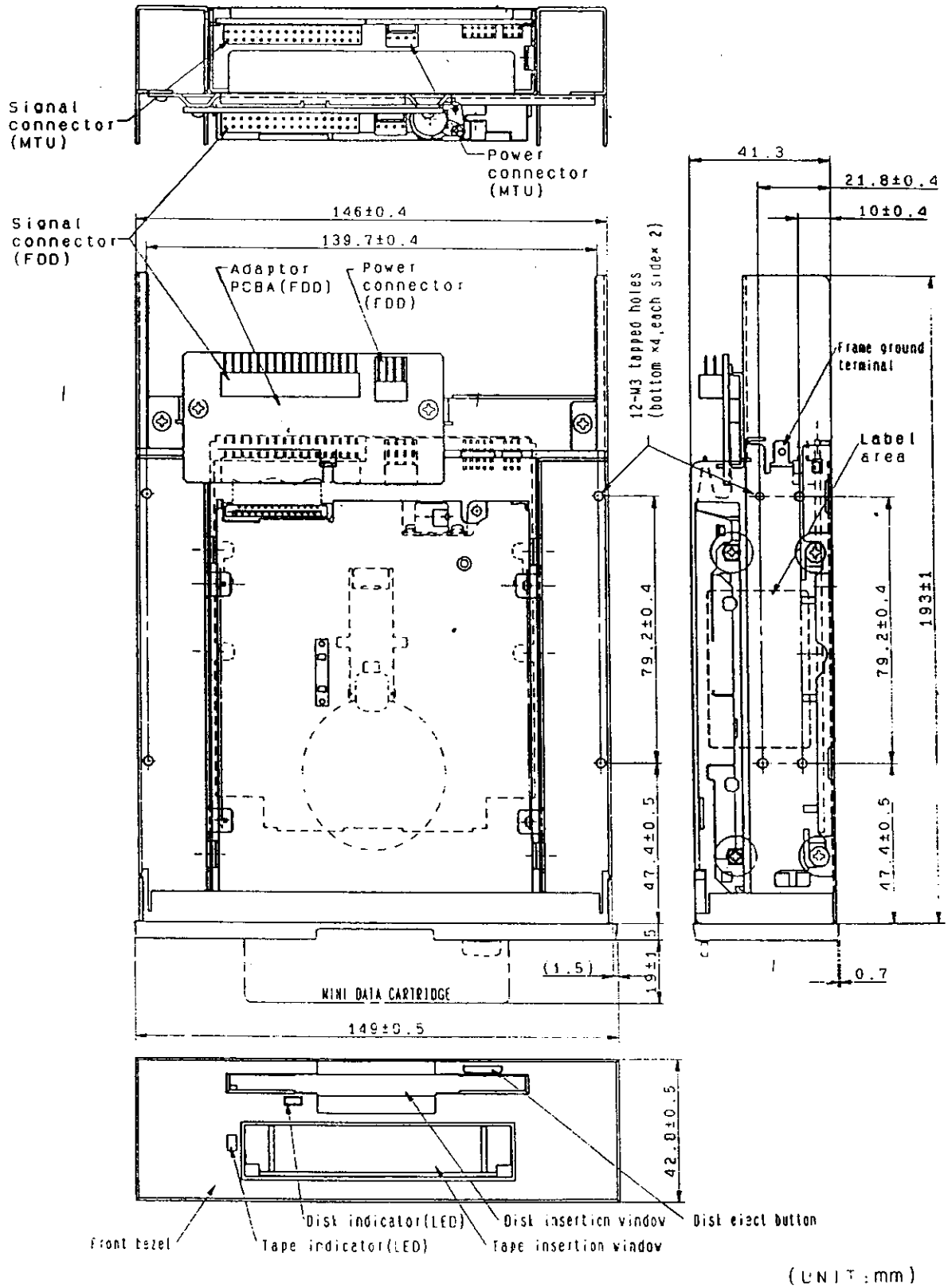
(b) The cartridge may be inserted vertically from the front.

(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.



(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 1×10^7 bits read
(4) Hard error : 1 or less per 1×10^{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 : 3×10^6 passes/track or more
(4) Disk insertion : 1.5×10^4 times or more
(5) Seek operation life : 1×10^7 random seeks or more
(6) Preventive maintenance : Not required (for typical operation duty)
(7) Error rate
- (a) Soft error : 1 or less per 1×10^9 bits read
  A soft (recoverable) error is defined that it can be read correctly within three retries.
- (b) Hard error : 1 or less per 1×10^{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 1×10^6 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 mains 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) Encording 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 : ± 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) : ± 3%
(6) Instantaneous speed variation (ISV) : ± 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 : 0.5μA
④ Minimum hysteresis width : 0.2V DC

OUTLINE

This specification provides a description for the TEAC FT-3010 micro streamer: Mini Data Cartridge Unit (hereinafter, referred to as the MTU).

Model	FT-3010-505
TEAC Part number	19305135-05
Front bezel color	Light gray
Indicator LED color	Green
Form factor	3.5-inch (height: 1 inch)
Safety standards	UL 1950 CSA No.950 TÜV EN60950
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 ±0.0005*in* (6.27 ±0.013mm) 3. Length : 400ft (121.9m)
Recording format	QIC-3010-MC
Readable format	QIC-3010-MC/QIC-80-MC
Recording density	22,125ftpi
Data density	22,125bpi
Formatted data capacity	Approx. 346MB (approx. 692MB when data is compressed by a factor of 50%)
Power supplies	+5V DC, +12V DC
Interface	In compliance with QIC-117 (alias FDD interface)
Drive select setting	SOFTWARE PHANTOM SELECT 0 at factory-preset
Terminator	1kΩ (fixed)

(Table 1) General specifications

CONSTRUCTION

External Construction

(1) Height : 25.4mm (1.00 in), Nom.

(2) Width : 101.6mm (4.00 in), Max.

(3) Depth : 145.0mm (5.71 in), Nom.

(4) Weight : Approx. 420g (Approx. 0.93 lbs)

(5) 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.

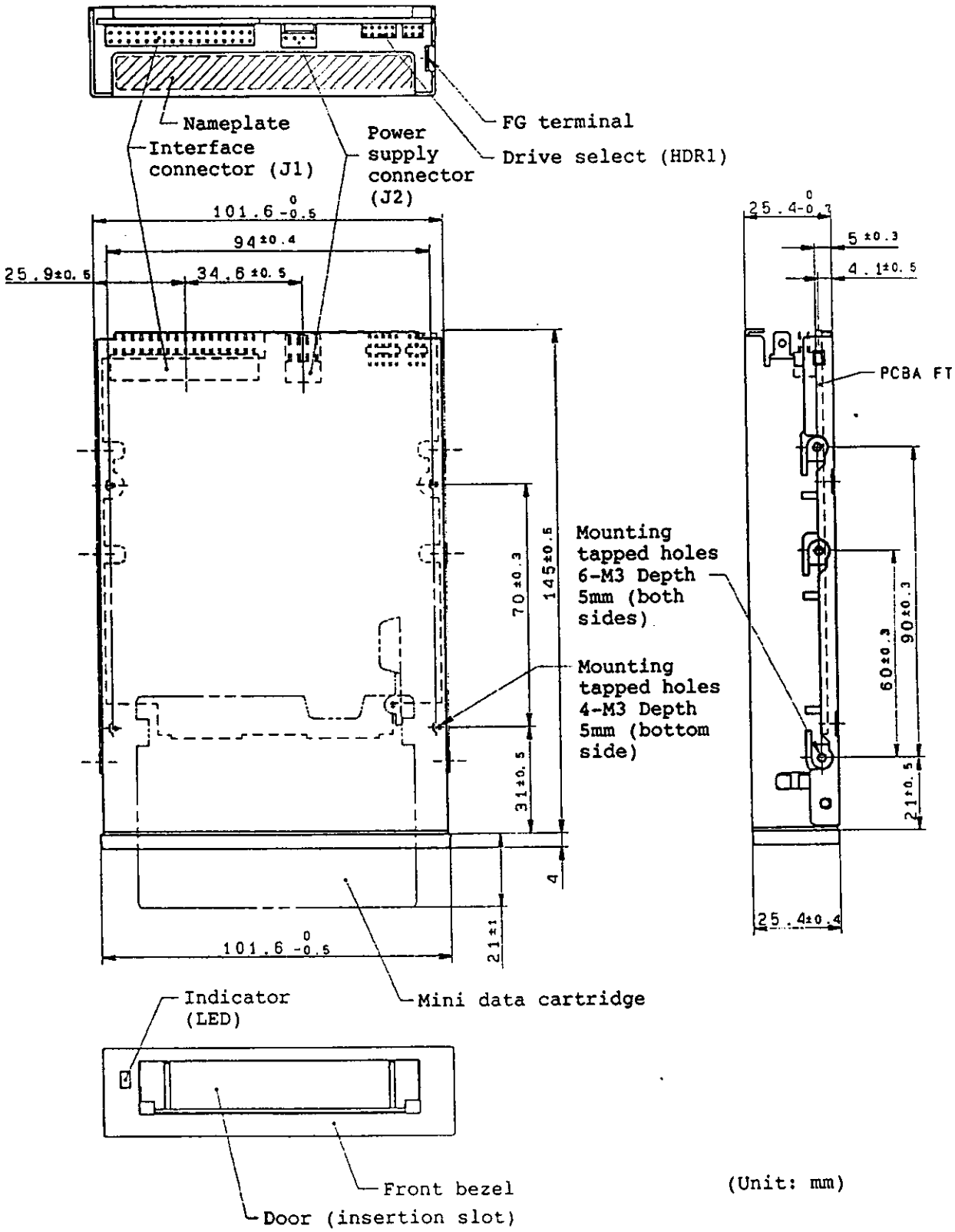
(6) Mounting method : The drive is mounted with screws through the mounting holes at the sides and bottom. Refer to Fig.1 for the positions of the mounting holes.

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

(7) Color of front bezel : Refer to Table 1.

(8) Indicator LED color : Refer to Table 1.

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



(Fig.1) MTU external view

ENVIRONMENTAL CONDITIONS

Items		Conditions
Ambient temperature	In operation	5~45°C (41~113°F)
	During storage or transportation	-22~60°C (-8~140°F)
Temperature gradient	In operation	6°C (10.8°F) or less per hour(non-condensing)
	During storage or transportation	30°C (54°F) or less per hour(non-condensing)
Relative humidity	In operation	20~80% (non-condensing) Maximum wet-bulb temperature: 26°C (79°F)
	During storage	10~90% (non-condensing) Maximum wet-bulb temperature: 40°C (104°F)
	During transportation	10~90% (non-condensing) Maximum wet-bulb temperature: 45°C (113°F)
Vibration	In operation	1G or less (10~100Hz, sweeps at 1oct/min.) 0.5G or less (100~600Hz, sweeps at 1oct/min.)
	Non-operating, During transportation	1.5G or less (10~100Hz, sweeps at 1/4oct/min.)
Shocks	In operation	5G (sine half-wave 11msec) or less
	One shock at non-operating, One shock during transportation	70G (sine half-wave 11msec) or less
Transportation conditions		The general rule level I of the appropriate package goods test method in JIS-Z0200 should be satisfied when specified packing case is used. When a long period (48 hours or more) is required for transportation such as by ship, storage environmental conditions should be applied.

(Table 2) Environmental conditions

6. RECORDING CHARACTERISTICS

(1) Recording format	: In compliance with QIC-3010-MC
(2) Number of tracks (on tape)	: 40
(3) Encording 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. 346MB
(9) Data capacity per track	: Approx. 8.67MB
(10) Number of segments per track	: 292 (Min.)
(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. 346MB, but approx. 692MB with a data compression factor of 50%.

2. Data capacity is under the following conditions.

(a) Speed tolerance : ±0%

(b) Number of defect (on tape) : 0

STANDARDS OF RECORDING FORMAT AND INTERFACE

This 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-117
COMMON COMMAND SET INTERFACE SPECIFICATION FOR FLEXIBLE DISK CONTROLLER BASED MINICARTRIDGE TAPE DRIVES

(3) QIC-113
HOST INTERCHANGE FORMAT

TAPE USED (MINI DATA CARTRIDGE)

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) Preformatted tape
3M : MC3000XL PIMAT (400ft)

(2) Unformatted tape
3M : MC3000XL (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) Preformatted tape : not commercially available

DATA COMPATIBILITY

(1) Write compatible : In compliance with QIC-3010-MC

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

RELIABILITY OF DATA AND DRIVE

(1) Soft error	: 1 or less per 1×10^{7} bits read
(2) Unrecoverable error	: 1 or less per 1×10^{14} bits read
(3) Mean Time to Repair (MTTR)	: 20 min. or less
(4) Mean Time Between Failures (MTBF) at duty cycle 10%	: 119,000POH or more

OUTLINE

This specification provides a description for the TEAC FT-3020 micro streamer: Mini Data Cartridge Unit (hereinafter, referred to as the MTU). The MTU is available with four different colors of front bezel.

Model	FT-3020-501	
TEAC Part number	19305145-01	
Front bezel color	Light gray	
Indicator LED color	Green	
Form factor	3.5-inch (height: 1 inch)	
Safety standards	UL 1950 CSA No.950 TÜV EN60950	
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 ±0.0005*in* (6.27 ±0.013mm) 3. Length : 400ft (121.9m)	
Recording format	QIC-3020-MC/QIC-3010-MC	
Readable format	QIC-3020-MC/QIC-3010-MC/QIC-80-MC	
Recording density	QIC-3020-MC	44,250ftpi
	QIC-3010-MC	22,125ftpi
Data density	QIC-3020-MC	44,250bpi
	QIC-3010-MC	22,125bpi
Formatted data capacity	QIC-3020-MC	Approx. 680MB (approx. 1,360MB when data is compressed by a factor of 50%)
	QIC-3010-MC	Approx. 346MB (approx. 692MB when data is compressed by a factor of 50%)
Power supplies	+5V DC, +12V DC	
Interface	In compliance with QIC-117 (alias FDD interface)	
Drive select setting	SOFTWARE PHANTOM SELECT 0 at factory-preset	
Terminator	1kΩ (fixed)	

(Table 1) General specifications

CONSTRUCTION

External Construction

(1) Height : 25.4mm (1.00 in), Nom.

(2) Width : 101.6mm (4.00 in), Max.

(3) Depth : 145.0mm (5.71 in), Nom.

(4) Weight : Approx. 420g (Approx. 0.93 lbs)

(5) 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.

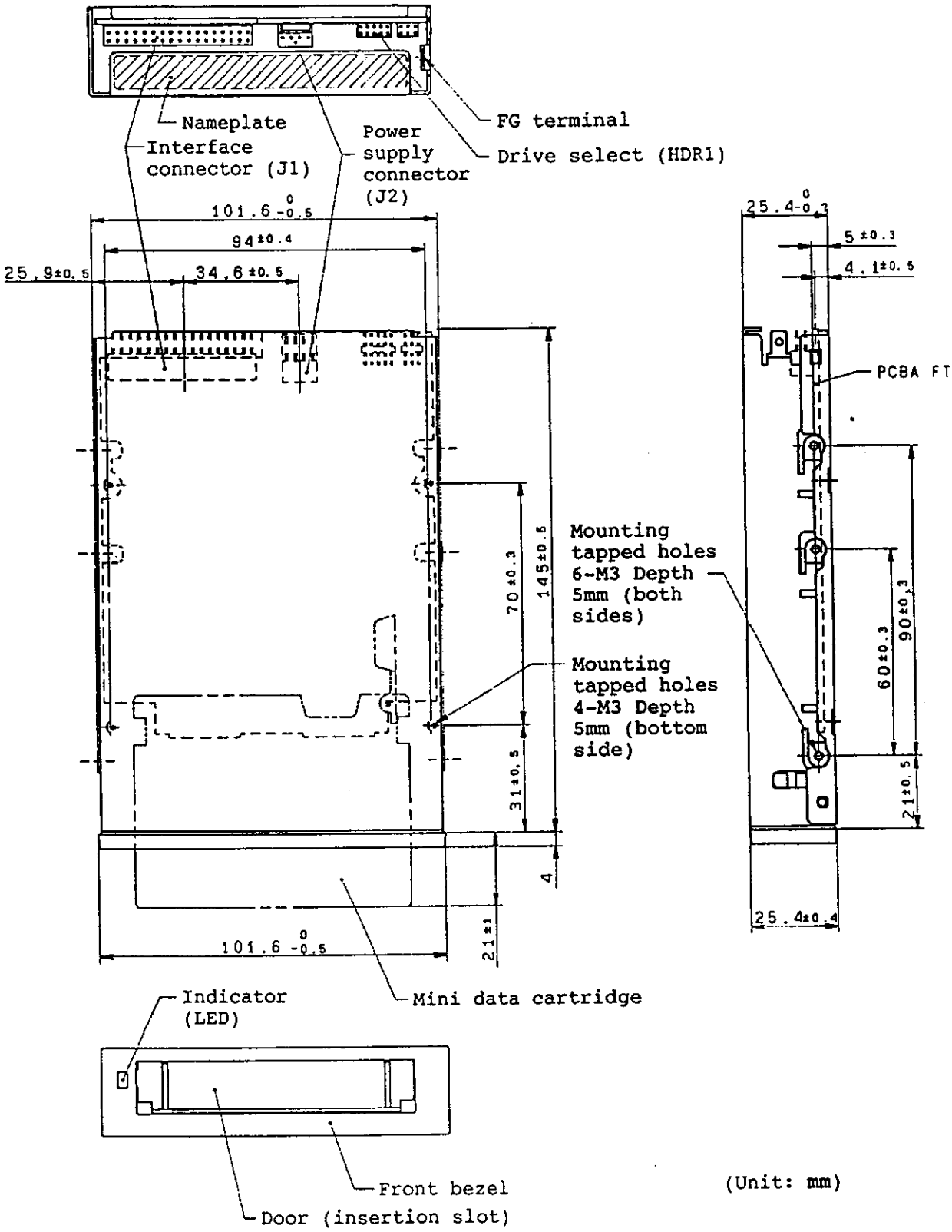
(6) Mounting method : The drive is mounted with screws through the mounting holes at the sides and bottom. Refer to Fig.1 for the positions of the mounting holes.

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

(7) Color of front bezel : Refer to Table 1.

(8) Indicator LED color : Refer to Table 1.

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



(Fig.1) MTU external view

ENVIRONMENTAL CONDITIONS

Items		Conditions
Ambient temperature	In operation	5~45°C (41~113°F)
	During storage or transportation	-22~60°C (-8~140°F)
Temperature gradient	In operation	6°C (10.8°F) or less per hour(non-condensing)
	During storage or transportation	30°C (54°F) or less per hour(non-condensing)
Relative humidity	In operation	20~80% (non-condensing) Maximum wet-bulb temperature: 26°C (79°F)
	During storage	10~90% (non-condensing) Maximum wet-bulb temperature: 40°C (104°F)
	During transportation	10~90% (non-condensing) Maximum wet-bulb temperature: 45°C (113°F)
Vibration	In operation	1G or less (10~100Hz, sweeps at 1oct/min.) 0.5G or less (100~600Hz, sweeps at 1oct/min.)
	Non-operating, During transportation	1.5G or less (10~100Hz, sweeps at 1/4oct/min.)
Shocks	In operation	5G (sine half-wave 11msec) or less
	One shock at non-operating, One shock during transportation	70G (sine half-wave 11msec) or less
Transportation conditions		The general rule level I of the appropriate package goods test method in JIS-Z0200 should be satisfied when specified packing case is used. When a long period (48 hours or more) is required for transportation such as by ship, storage environmental conditions should be applied.

(Table 2) Environmental conditions

RELIABILITY OF DATA AND DRIVE

(1) Soft error	: 1 or less per 1 $\times 10^{7}$ bits read
(2) Unrecoverable error	: 1 or less per 1 $\times 10^{14}$ bits read
(3) Mean Time to Repair (MTTR)	: 20 min. or less
(4) Mean Time Between Failures (MTBF) at duty cycle 10%	: 119,000POH or more

RECORDING CHARACTERISTICS

(1) Recording format	: In compliance with QIC-3020-MC and QIC-3010-MC
(2) Number of tracks (on tape)	: 40
(3) Encoding system	: MFM
(4) Recording form	: Single track serpentine recording
(5) Recording density	: 44,250ftpi for QIC-3020-MC 22,125ftpi for QIC-3010-MC
(6) Data density	: 44,250bpi for QIC-3020-MC 22,125bpi for QIC-3010-MC
(7) ECC	: Reed Solomon (3-order)
(8) Data capacity per tape (at full write)	: Approx. 680MB for QIC-3020-MC Approx. 346MB for QIC-3010-MC
(9) Data capacity per track	: Approx. 17.0MB for QIC-3020-MC Approx. 8.67MB for QIC-3010-MC
(10) Number of segments per track	: 572 for QIC-3020-MC 292 for QIC-3010-MC
(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. 680MB for QIC-3020-MC MODE, but approx. 1,360MB with a data compression factor of 50%.

2. Data capacity is under the following conditions.

(a) Speed tolerance : ±0%

(b) Number of defect (on tape) : 0

TAPE USED (MINI DATA CARTRIDGE)

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) Preformatted tape for QIC-3020-MC
3M : MC3000XL TAUMAT (400ft)

(2) Preformatted tape for QIC-3010-MC
3M : MC3000XL PIMAT (400ft)

(3) Unformatted tape
3M : MC3000XL (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) Preformatted tape : not commercially available

STANDARDS OF RECORDING FORMAT AND INTERFACE

This MTU complies with the following standards in order to be compatible with the recording format and interface.

(1) QIC-3020-MC
SERIAL RECORDED MAGNETIC TAPE MINICARTRIDGE FOR INFORMATION INTERCHANGE

(2) QIC-3010-MC
SERIAL RECORDED MAGNETIC TAPE MINICARTRIDGE FOR INFORMATION INTERCHANGE

(3) QIC-117
COMMON COMMAND SET INTERFACE SPECIFICATION FOR FLEXIBLE DISK CONTROLLER BASED MINICARTRIDGE TAPE DRIVES

(4) QIC-113
HOST INTERCHANGE FORMAT