

97

TEAC®



SERVICE MANUAL

C-3X

Stereo Cassette Deck

1 SPECIFICATIONS AND SERVICE DATA

NOTES:

1. Improvements may result in changes in specifications and service data.
2. 0 dB is referenced to 0.775 V in this manual unless otherwise specified.
3. All the electrical numeral values are for STANDARD speed unless otherwise specified.

SPECIFICATIONS

Track System 4-track, 2-channel stereo
Heads 3: Erase, record and playback
Type of Tape Cassette tape, C-60 and C-90 (Philips type)
Tape Speed 4.75 cm/s (1-7/8 ips), 9.5 cm/s (3-3/4 ips)
Input (level and impedance)
MIC: Specified input level: -57 dB (1.09 mV)/10k ohms
 Minimum input level: -67 dB (346 μ V)
LINE IN: Specified input level: -9 dB (275 mV)/50k ohms
 Minimum input level: -19 dB (86.9 mV)
Output (level and impedance)
OUTPUT: Maximum output level: -2.5 dB (581 mV)/50k ohms
 Specified output level: -5 dB (436 mV)
PHONES: Specified output level: -15.8 dB (126 mV)/8 ohms

Equalization

	HIGH	STANDARD
METAL	3180 μ s + 35 μ s	3180 μ s + 70 μ s
Co(CrO ₂)	3180 μ s + 35 μ s	3180 μ s + 70 μ s
NORMAL	3180 μ s + 50 μ s	3180 μ s + 120 μ s

Head Configuration

1/2-track, 1-channel erase head
 1/4-track, 2-channel record head and playback head in a single housing

Motors 1 DC servo capstan motor
 1 DC reel motor

Bias Frequency 100 kHz \pm 5 kHz

Operation Position Horizontal

Power Requirements

100/117/220/240 V AC, 50/60 Hz, 41 W (General export model)
 117 V AC, 60 Hz, 41 W (U.S.A./Canada model)
 220 V AC, 50 Hz, 41 W (Europe model)
 240 V AC, 50 Hz, 41 W (U.K./Australia model)

Weight 9 kg (19-3/16 lbs.) net

Dimensions See Fig. 3-2

* Noise Reduction System and Headroom Extension System manufactured under license from Dolby Laboratories Licensing Corporation. 'Dolby' and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.

dbx noise reduction system made under license from dbx, Incorporated. The word dbx and the Symbol are trademarks of dbx, Incorporated.

SERVICE DATA

MECHANICAL

Tape Speed Deviation 3,000 Hz \pm 45 Hz
Tape Speed Drift 30 Hz
Wow and Flutter

	HIGH	STANDARD
Playback	0.065% (WRMS)	0.08% (WRMS)
Record/playback	0.18% (RMS)	0.25% (RMS)

Pinch Roller Pressure 390 g to 490 g (13.8 oz to 17.3 oz.)
Reel Torque (at STANDARD speed)
 Take-up: 45 to 65 g-cm (0.625 to 0.903 oz-inch)
 Supply: 3 to 8 g-cm (0.0417 to 0.111 oz-inch)
 F.F. & REW: 90 to 160 g-cm (1.25 to 2.22 oz-inch)
Fast Winding Time
 90 seconds for MTT-501 (C-60)

ELECTRICAL

Frequency Response
 See Figs. 5-9 to 5-13.
Signal-to-noise Ratio

Playback	Better than:	
	HIGH	STANDARD
METAL, Co(CrO ₂)	55 dB	52 dB
NORMAL	53 dB	48 dB

Overall	Better than:	
	HIGH	STANDARD
METAL, Co(CrO ₂)	49 dB	48 dB
NORMAL	46 dB	45 dB

S/N is improved by 5 dB at 1 kHz and 10 dB above 5 kHz when Dolby NR* is used.

Erase Efficiency 65 dB min. at 1 kHz (measured with input 10 dB higher than the specified input level)

Channel Separation 35 dB min. at 1 kHz

Adjacent Track Crosstalk 40 dB min. at 125 Hz

Total Harmonic Distortion 2.0% or less with NORMAL, Co(CrO₂) and METAL tapes

CAUTION

△ Parts marked with this sign are safety critical components. They must always be replaced with identical components - refer to the TEAC Parts List and ensure exact replacement.

2 PARTS LOCATION

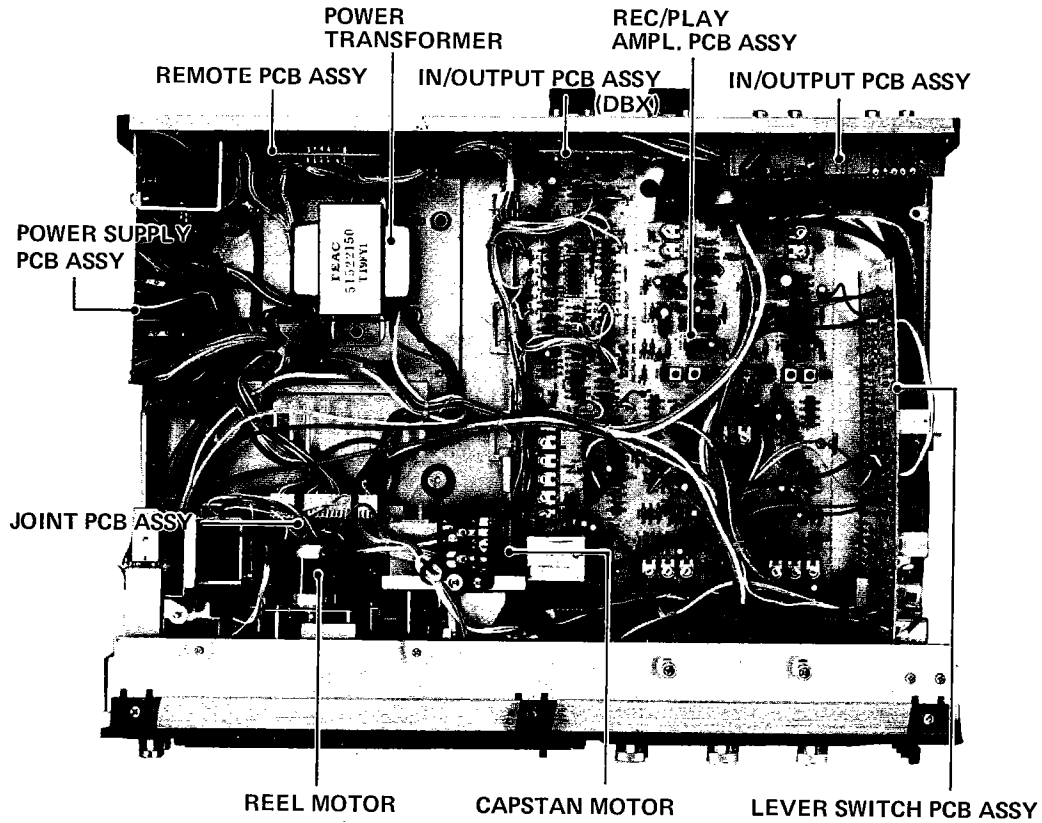


Fig. 2-1

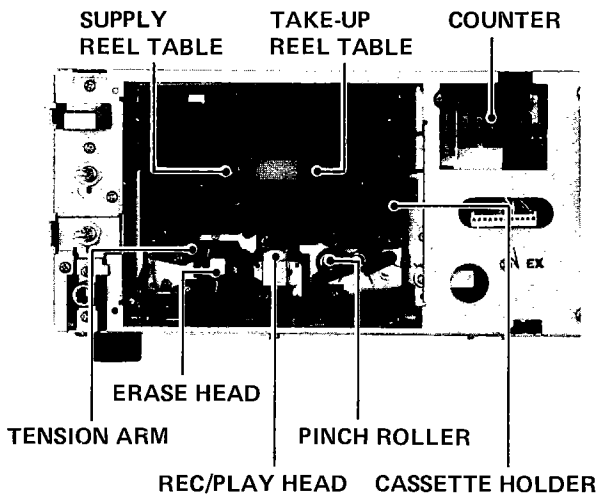


Fig. 2-2

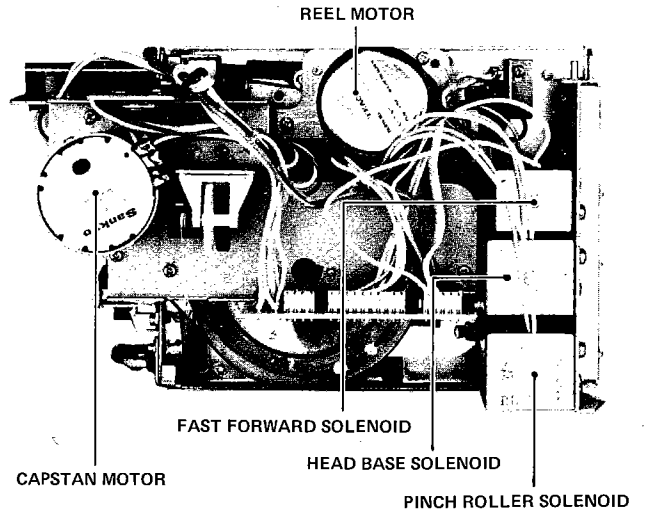


Fig. 2-3

3 REMOVAL OF EXTERNAL COMPONENTS

Disassemble in number-order

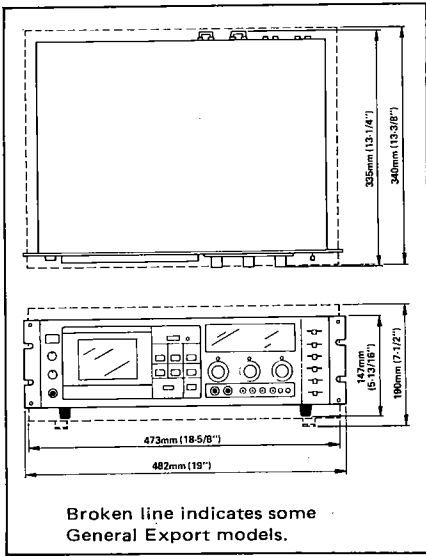


Fig. 3-2 Dimensions

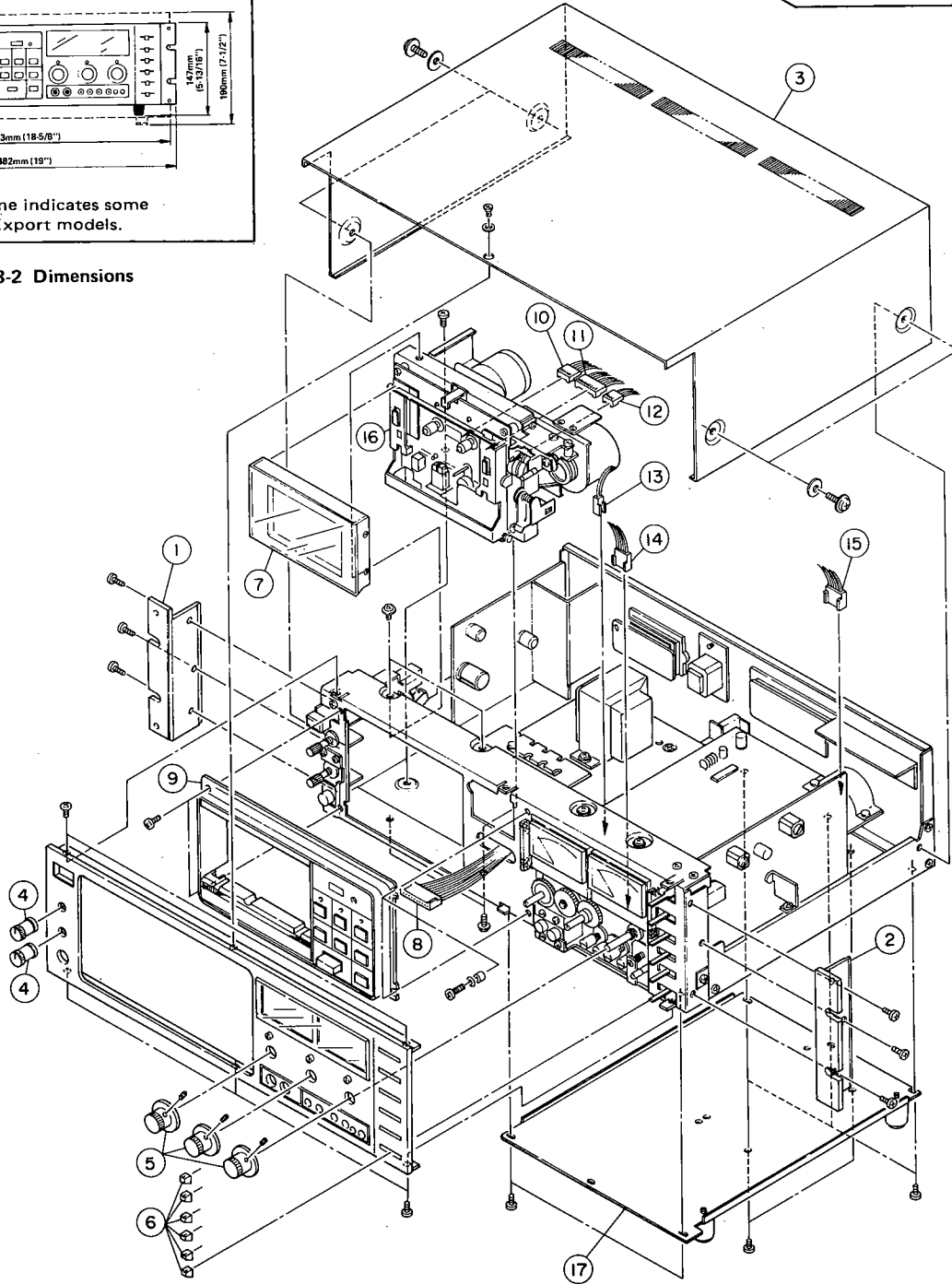
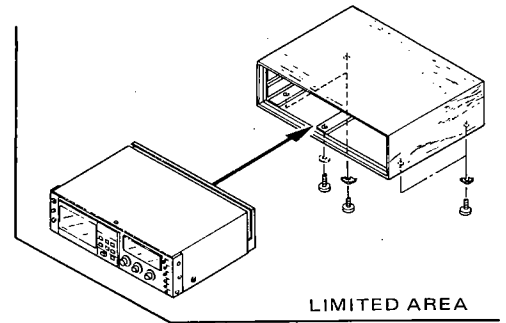


Fig. 3-1

4 MECHANICAL ADJUSTMENTS AND CHECKS

Note: All checks and adjustments are made with the SPEED switch set to STANDARD, unless otherwise indicated.

4-1 REEL TORQUE

1. Load the cassette torque meter on the deck and read the pointer indication on the dial scale for each tape transport operation. The measured torque should be within the following values:
 Take-up: 45 to 65 g-cm (0.62 to 0.90 oz-inch)
 Supply: 3 to 8 g-cm (0.042 to 0.11 oz-inch)
 F.F. and REW: 90 to 160 g-cm (1.25 to 2.22 oz-inch)

4-2 PINCH ROLLER PRESSURE

1. With the cassette holder shut and no tape loaded, put the deck in PLAY mode.
2. Hook a spring scale on the top of the pinch roller assembly plate, as shown in the illustration.
3. Pull the scale down until there is sufficient force to separate the pinch roller from the capstan shaft.
4. Ease pressure until the pinch roller makes just enough contact with the capstan shaft so that the pinch roller just begins to turn. At this point, note the reading on the scale. It should be from 390 g to 490 g (13.8 oz. to 17.3 oz.)
5. If the pressure is not within the prescribed specifications, it may be adjusted by first removing the pinch roller spring from the pinch roller assembly and then bending the spring as shown in the illustration.

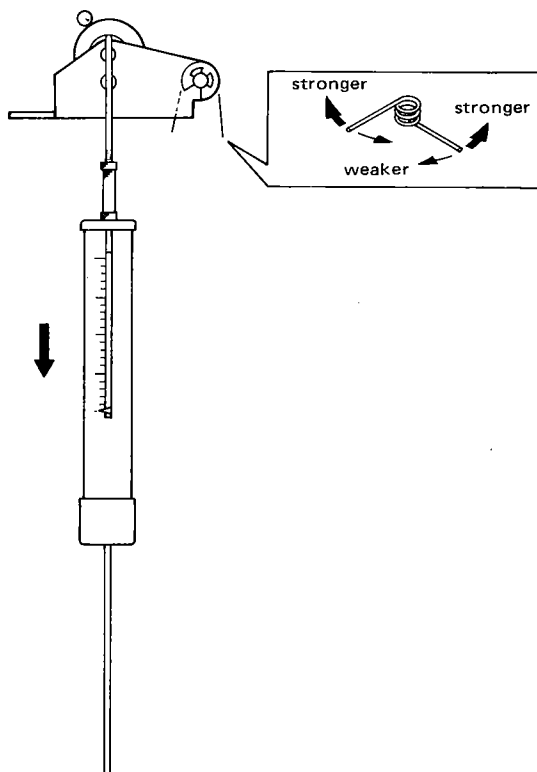


Fig. 4-1

4-3 HEAD BASE PLATE POSITIONING

1. Set the deck in the PLAY mode.
2. Push the head base plate by hand in the direction of the arrow and check that the head base plate and the stopper portion of the mechanism chassis make contact.
3. If there is any clearance, loosen the two screws on the head base plate solenoid and reposition the solenoid until the clearance is eliminated.

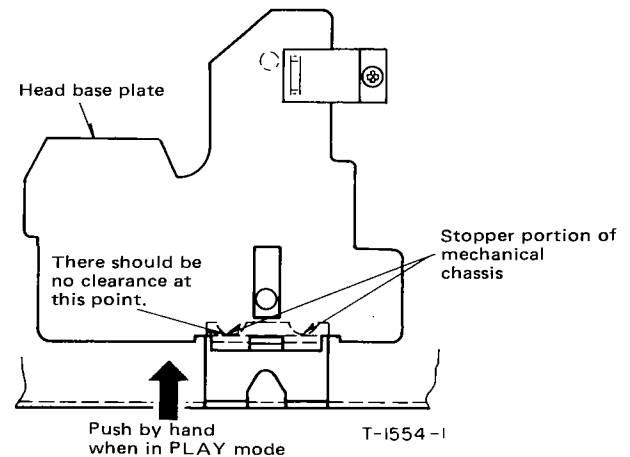


Fig. 4-2

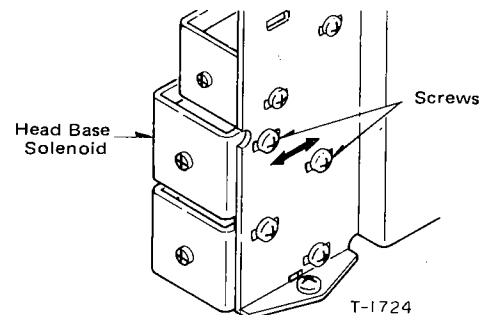


Fig. 4-3 Head base solenoid location

4-4 CAPSTAN ASSEMBLY THRUST

1. Turn the thrust adjusting screw so that thrust of the capstan shaft is within 0.05 mm to 0.15 mm.

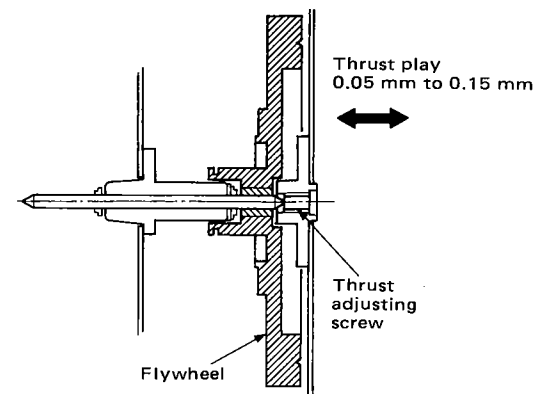


Fig. 4-4

4-5 TAPE SPEED

STANDARD speed

1. Connect a frequency counter to the deck as shown in Fig. 4-5.
2. Play a tape for about five minutes to warm up the deck, then load a TEAC MTT-111 test tape containing a 3000-Hz test tone and play the test tape from the beginning.
3. While the tape is playing, use a common slotted screwdriver with the handle completely insulated from the blade, and adjust the control on the MOTOR PCB (as far as possible) for a reading of 3000 Hz (Spec. 3000 Hz \pm 5 Hz) on the frequency counter.
4. Play the tape at the beginning and at the end, and check that the speed deviation is within the prescribed limits by observing that the reading on the frequency counter never deviates more than \pm 45 Hz from 3000 Hz, nor drifts more than 30 Hz at any given time.

HIGH speed

5. Set the deck to HIGH speed and follow all the procedures described above. Since the speed is doubled, all the values described in the preceding steps are also doubled to be compatible.
6. If the tape speed is not within the prescribed specifications, check the pinch roller pressure and the tape transport mechanism for any abnormality, and make sure the tape path is clean.

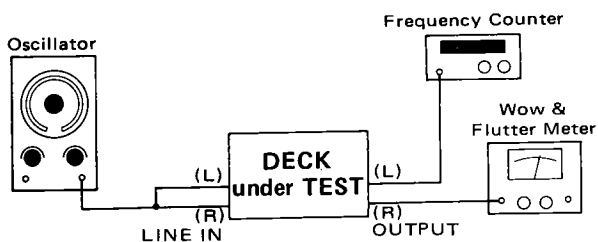


Fig. 4-5

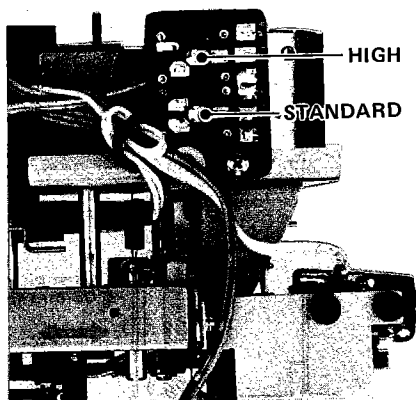


Fig. 4-6 Tape speed adjustment location

4-6 WOW AND FLUTTER

Note: These measurements should be made at the beginning, middle, and the end of the tape.

1) PLAYBACK

STANDARD Speed

1. Connect a wow-and-flutter meter to the deck as shown in Fig. 4-5.
2. Load and play a TEAC MTT-111 test tape.
3. Check that the reading on the wow-and-flutter meter is within 0.08% (WRMS).

2) SIMULTANEOUS RECORD/PLAYBACK METHOD

STANDARD Speed

4. Load a TEAC MTT-501 test tape (blank) and record a 3000-Hz signal.
5. With the MONITOR switch in the TAPE position, note the reading on the wow-and-flutter meter, it should not be more than 0.25% (RMS).

HIGH Speed

6. Repeat the above procedures with the deck set to HIGH speed. The wow and flutter should not be more than 0.18% (RMS).

3) NON-SIMULTANEOUS RECORD/PLAYBACK METHOD

STANDARD Speed

7. Rewind the tape to the beginning of the recorded section previously made in step 4, and play it at STANDARD speed.
8. The wow and flutter should not be more than 0.25% (RMS).

HIGH Speed

9. Rewind the tape to the beginning of the portion previously recorded in and play it at HIGH speed. The wow and flutter should not be more than 0.18% (RMS).

4-7 MICROSWITCH (A) ASSEMBLY CLEARANCE

1. Insert a blank cassette and close the cassette holder.
2. Loosen the two screws on the microswitch (A).
3. Move the switch so that actuator of the switch contracts the safety lever.
4. Adjust the switch position to obtain a clearance of between 0.1 mm to 0.3 mm.
5. Retighten the screws.

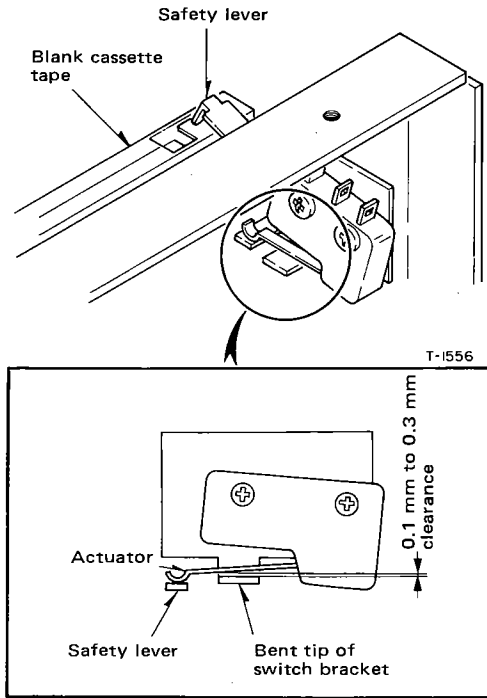


Fig. 4-7

4-8 MICROSWITCH (B) ASSEMBLY CLEARANCE

1. Push the EJECT button to open the cassette holder.
2. Loosen the two screws on the microswitch (B).
3. Move the switch so that switch actuator contacts the bent projecting portion of the eject lever.
4. Adjust the switch position to obtain a clearance of approximately 1 mm.
5. Retighten the screws.

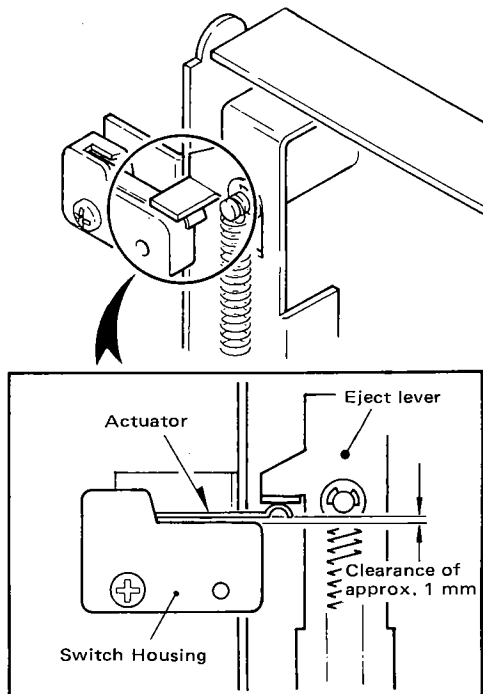


Fig. 4-8

4-9 LUBRICATION

Lubrication is only required when parts are replaced. For this purpose, use the oil and grease specified below.

Oil: TEAC spindle oil (from TEAC TZ-255 oil kit), Mobil D.T.E. Oil Light, or equivalent

Grease: ORE-LUBE G1/3 or equivalent

1. Apply a drop of oil with an oil applicator to a point about 1/3 the way down the shaft (from the free end) of the flywheel, then insert the shaft into the capstan housing.
2. Apply a suitable amount of light grease to the well of the flywheel bearing.

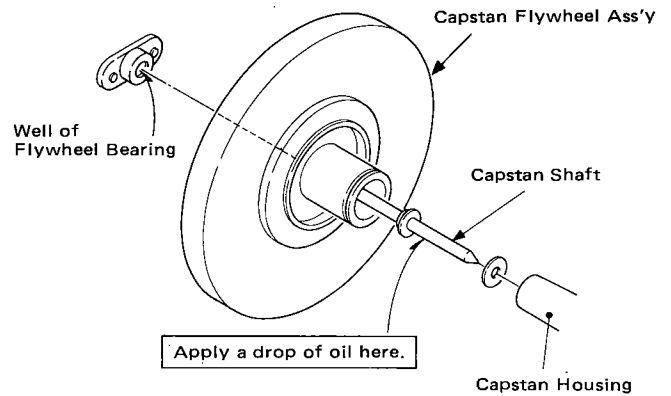


Fig. 4-9

4-10 VOLTAGE SELECTION (FOR GENERAL EXPORT MODELS)

1. Always disconnect the power line cord before making these adjustments.
2. Remove the top cover of the deck by removing the screws from the sides.
3. Locate the voltage selector, shown in the illustration (in front of the power transformer).
4. Loosen the two screws in the shorting bar and move the bar so that it jumpers the opposing terminals marked with the required voltage (100, 117, 220 or 240).
5. Retighten the screws and replace the top cover.

4-11 AC POWER LINE FREQUENCY

Since the C-3X uses a DC servo motor, 50 Hz or 60 Hz operation is permitted without any change in power line frequency.

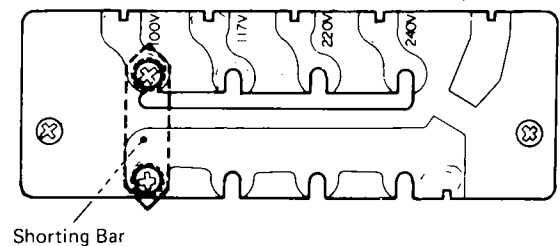


Fig. 4-10

5 ELECTRICAL ADJUSTMENTS AND CHECKS

PRECAUTIONS

1. Before beginning any checks or adjustments, clean and demagnetize the entire tape path.
2. Make sure the deck is properly set for the voltage in your locality.
3. In general, adjustments and checks are done in the order of L-ch then R-ch. Double REF. NOs. and test point designations indicate L-ch/R-ch.
(Example: R11/R21)
4. For this deck, 0 dB is referenced to 0.775 V. If you are using an AC voltmeter which references 0 dB to 1 V, appropriate compensation should be made.
5. The AC voltmeter used in the procedures must have an input impedance of 1M ohms or more.
6. Note the "Deck settings" at the top of each chart. These settings must be used for all the checks in each chart unless explicitly stated otherwise.

-70 dB or more . . . What does it mean?

In reference to some specifications, you may come across an expression like: "-70 dB or more". This means that the lower the value of this specification, the greater the absolute value of the specification and the better the performance of the deck. For instance, a noise floor of -76 dB is better than -70 dB, because this means that the level of noise is lower. So in this case, "-70 dB or more" means at least as good a value as -70 dB and maybe even better, i.e., -71 dB.

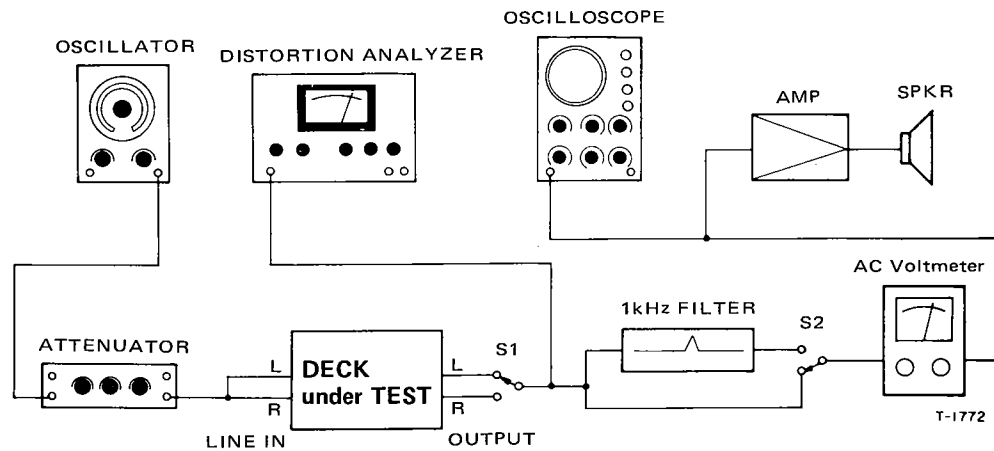


Fig. 5-1 Basic test setup

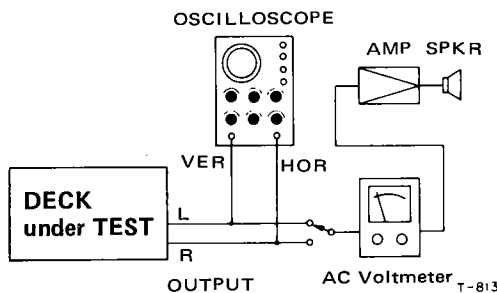


Fig. 5-2 Test setup for azimuth check

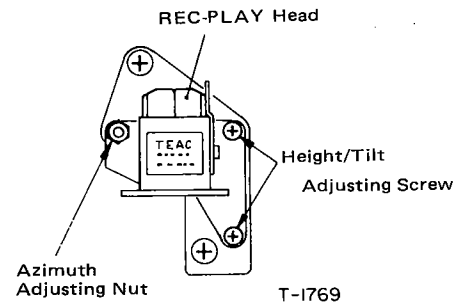


Fig. 5-3 Azimuth adj. nut location

Deck settings:
 MONITOR sw.: TAPE
 NR SYSTEM sw.: OUT
 SPEED sw.: STANDARD
 EQ sw.: METAL

TEAC test tapes:
 MTT-150: For Dolby level calibration
 MTT-316: For playback frequency response check for METAL, Co(CrO₂)
 MTT-216: For playback response check for NORMAL

5-1 PLAYBACK PERFORMANCE

ITEM	SETTING	INPUT SIGNAL	ADJUST (or CHECK)	MEASURING POINT:	REMARKS
				RESULT	
1. REC/PLAY head azimuth	Conn.: Fig. 5-2 OUTPUT cont.: convenient output level position	MTT-316 (12.5 kHz)	Azimuth nut of R-P heads (Fig. 5-3)	OUTPUT: • Phase: about 0° on 'scope (Fig. 5-4) • Max. output on VTVM	
2. Phase shift	Same as above	MTT-316	Check	OUTPUT: Phase: 45° min. (315 Hz) 90° min. (12.5 kHz)	
3. Specified output level	—	MTT-150	R11/R21	TP1/TP2 -2.5 dB (581 mV)	• Spec. setting of OUTPUT cont. • Spec. output level
	—	MTT-150	OUTPUT cont.	OUTPUT: -5 dB (436 mV)	
IMPORTANT: Do not change the OUTPUT cont. setting after establishing the proper settings as above.					
4. PEAK LEVEL meter	—	MTT-150	R12/R22	PEAK LEVEL meter: 0 dB	
5. Frequency response	EQ: METAL, Co(CrO ₂) Adjust for 10 kHz to be the same level as ref. signal (315 Hz)	MTT-316	R10/R20	OUTPUT: Fig. 5-9	
	EQ: NORMAL	MTT-316	Check	OUTPUT: At 10 kHz, should be 3 dB to 6 dB higher than measured in above step.	
6. Signal-to-noise ratio	SPEED: STANDARD and HIGH EQ: METAL Co(CrO ₂) NORMAL	Fully-erased tape: (Use bulk tape eraser) .METALMTT-5061MTT-501	Check	OUTPUT: } { 52 dB min. (STD) 55 dB min. (HI) } { 48 dB min. (STD) 53 dB min. (HI)	Ratio of spec. output of -5 dB to noise
7. Headphone output level	Conn.: Fig. 5-5	MTT-150	Check	PHONES: -15.8 dB ±3 dB (89.0 mV to 178 mV)	8 ohm load

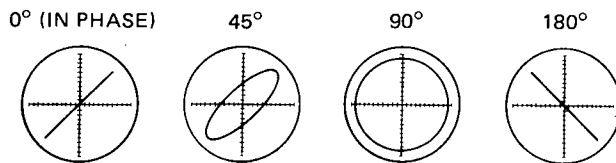


Fig. 5-4 Confirming phase relationship

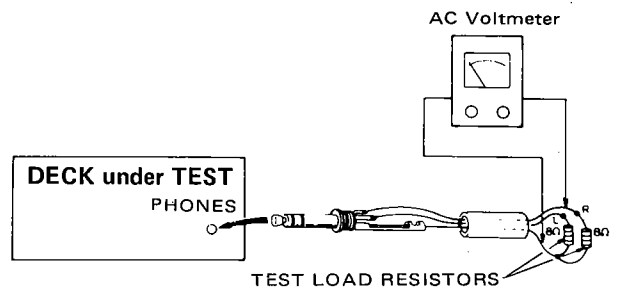


Fig. 5-5 Test setup for headphone check

Deck setting:
 REC-PAUSE mode
 MONITOR sw.: SOURCE
 NR SYSTEM sw.: OUT
 INPUT sw.: LINE
 OUTPUT cont.: Specified position (item 3)

5-2 MONITOR PERFORMANCE

ITEM	SETTING	INPUT SIGNAL	ADJUST (or CHECK)	MEASURING POINT:	REMARKS
				RESULT	
8. Min. input level	RECORD cont.: Max INPUT sw.: MIC	MIC: 400 Hz/-67 dB (346 μV)	Check	OUTPUT: -5 dB ±3 dB (308 mV to 615 mV)	MIC min. input level
	INPUT sw.: LINE	LINE IN: 400 Hz/-19 dB (86.9 mV)	Check	OUTPUT: -5 dB ±3 dB (308 mV to 615 mV)	LINE min. input level
9. LINE specified input level	—	LINE IN: 400 Hz/-9 dB (275 mV)	RECORD cont. (L/R)	OUTPUT: -5 dB (436 mV)	Specified setting of RECORD cont.
	—	LINE IN: 400 Hz/-9 dB (275 mV)	Check	DOLBY TP (TP1/TP2): -2.5 dB ± 0.5 dB (548 mV to 615 mV)	
IMPORTANT: Do not change the setting of the RECORD or OUTPUT controls, after establishing their setting as above.					
10. PEAK LEVEL meter	—	LINE IN: 400 Hz/-9 dB (275 mV)	Check	PEAK LEVEL meter: 0 dB ±1 dB	
11. "TEST IN"	INPUT sw.: TEST	LINE IN: 400 Hz/-29 dB (27.5 mV)	Check	PEAK LEVEL meter: 0 dB ±2 dB	

Deck settings:
 MONITOR sw.: TAPE
 NR SYSTEM sw.: OUT
 INPUT sw.: LINE
 SPEED sw.: STANDARD
 ADJUST/PRE-SET sw.: PRE-SET
 OUTPUT cont.: Specified position (item 3)
 RECORD cont. (L/R): Specified position (item 9)

TEAC test tapes:
 MTT-5061: For record test with Co(CrO₂)
 MTT-501: For record test with NORMAL
 METAL: For record test with METAL

5-3 RECORDING PERFORMANCE

ITEM	SETTING	INPUT SIGNAL	ADJUST (or CHECK)	MEASURING POINT:	REMARKS
				RESULT	
12. BIAS trap	Record-pause mode	LINE IN: No signal	L104/L204	BIAS TRAP TP (TP3/TP4): Min. reading	
13. Record bias	BIAS, EQ: METAL Tape: METAL	LINE IN: 400Hz & 10 kHz alternately/-42 dB (6.15 mV)	R15/R25	OUTPUT: Nearly equal level at both frequencies	
	BIAS, EQ: Co(CrO ₂) Tape: MTT-5061	LINE IN: 400 Hz & 10 kHz alternately/-42 dB (6.15 mV)	R14/R24	OUTPUT: Nearly equal level at both frequencies	
	BIAS, EQ: NORMAL Tape: MTT-501	LINE IN: 400 Hz & 10 kHz alternately/-42 dB (6.15 mV)	R13/R23	OUTPUT: Nearly equal level at both frequencies	

