

INSTRUCTION MANUAL

Bell

Model
BT-205IB
and BT-2050B



Stereophonic

TAPE RECORDER AND PLAYBACK UNIT

IMPORTANT

Please Read Carefully Before
Operating Your Recorder



BT-205 *Stereophonic* TAPE RECORDER

INTRODUCTION

The new Bell Stereophonic Tape Recorder Model BT-205 will open the door to a new experience in high-fidelity sound reproduction. With this instrument you can not only make and play back your own tapes but you can also play the new "stereo" tapes now being sold in large record stores and hi-fi centers everywhere.

Two-channel stereo tapes are actually dual-track pre-recorded tapes in which the second or lower track is used for the second recording channel in the 2-channel system. This track plays back simultaneously with the upper track but through a separate pre-amplifier and reproducer such as your hi-fi system or any radio, phonograph or T. V. set having a phono-radio-auxiliary input connection. Even though both channels have the same wide frequency or tonal range, the sounds in the 2nd. track are not identical to those in track #1 because a different microphone was used in recording. It is the subtle but vital differences in the sounds in each channel which provide the perception of depth and directivity in stereophonic reproduction.

The BT-205 Stereophonic Recorder has the pre-amplifier and tape head for both #1 and #2 channels built-in. It is only necessary to plug a cable between the recorder and your second channel reproducer. The cable is also supplied. The Model BT-205-IB recorder plays inline head (sometimes called stacked head) tapes. The Model BT-205-OB recorder plays "offset" head (sometimes called "staggered" head) tapes. Since most stereo tapes are now available either for "in-line" heads or for "offset" heads, be certain to specify which type is desired depending on whether you have the inline (IB) model or the offset (OB) model. The machine is not designed for making stereo tape recordings, only for playback of stereo tapes.

Below is a partial list of Stereo Tape Manufacturers:

R. C. A. Records Div., R. C. A. Corp.
Livingston Electronic Corp.
A-V Tape Libraries, Inc.
High Fidelity Recordings, Inc.

Concertapes, Inc.
Addison Foster
Audio Arts, Inc.
Celestial Tapes

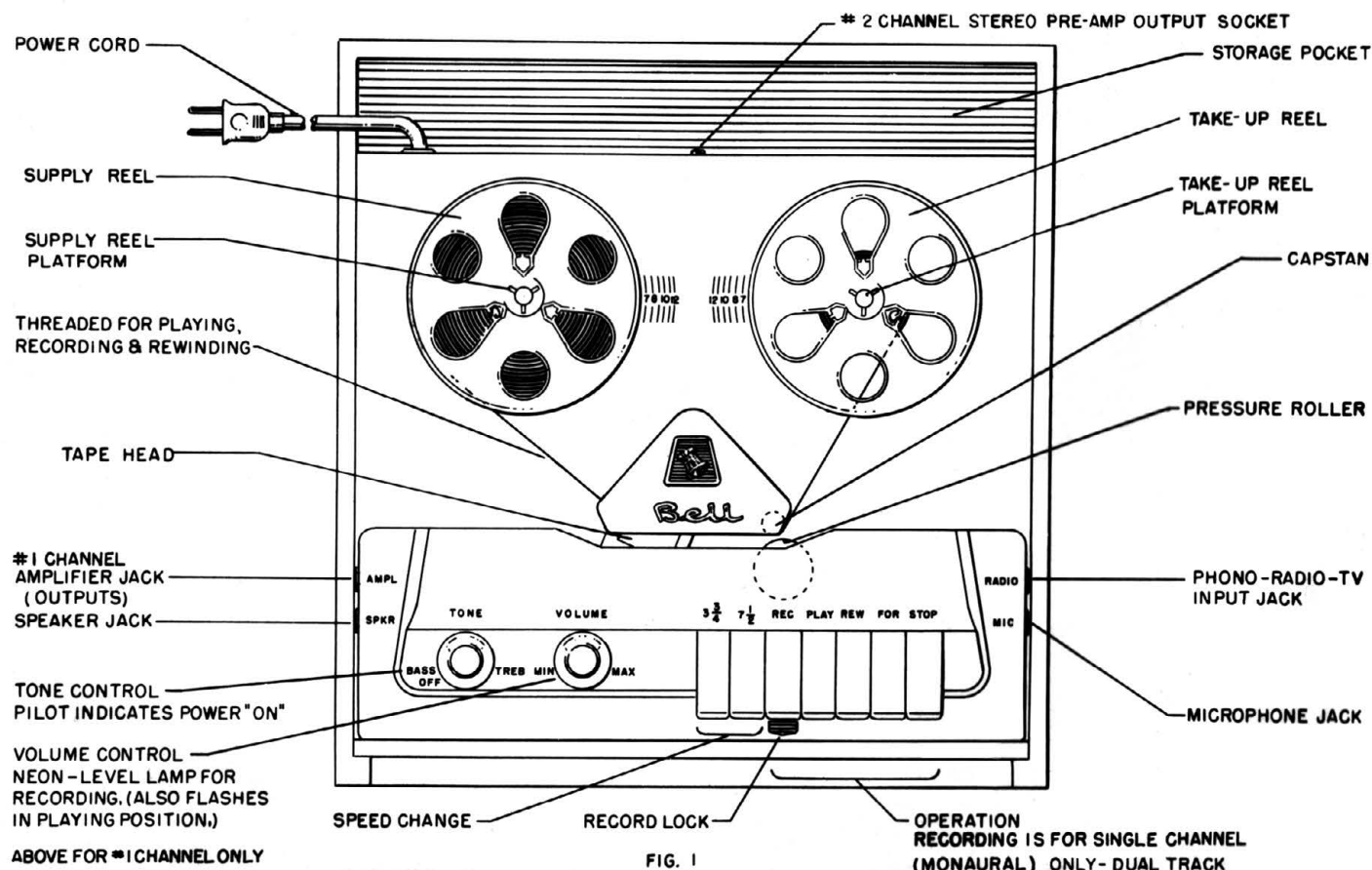
E. M. C. Recording Corp.
National Tape Library
Omegatape
Stereo Tape Associates

GENERAL INFORMATION

Before Using the recorder, open and remove the lid by sliding to the right at the rear. The recorder should be placed on a flat surface so that the feet will allow air to enter the bottom grille for ventilation. Study operation of the controls, see instruction card supplied on top panel. The 7 keys control tape speed ($3\frac{3}{4}$ or $7\frac{1}{2}$ inches per second) record, playback, rewind, forward and stop.

Always press key ALL THE WAY DOWN FIRMLY. First press STOP key and always press STOP key to stop tape when going from one key function to another, except speed change which can be done at any time. Press one key at a time.

Place a full reel of tape on the left-hand tape platform by turning reel while pressing down lightly so that the 3 slots in the reel center hole engage the 3 keys on the spindle. Place empty reel on right-hand side and draw tape end across and into center hub of empty reel. Feed end of tape into slot in hub and rotate reel to secure tape on hub. Drop tape into position shown and take up all slack in tape before turning unit on.



The power cord is contained in the storage pocket, remove and plug into 110-120 V AC outlet. **CAUTION-SOME BUILDINGS STILL HAVE DC CURRENT WHICH WILL DAMAGE THE MACHINE.** Be sure power cord does not touch edge of reel.

This machine will operate in either a horizontal or vertical position. It is equipped with two rubber reel spindle tips to hold the reels firmly on the spindles. Remove these (pull off) when loading tape on machine.

If machine has been exposed to cold temperatures for a long period of time, allow to warm up to room temperature before using.

NOTE 1. Use care when playing stereo or other recorded tapes not to press the red Record Key, as #1 channel track (the upper track) will be erased.

NOTE 2. When used monaurally (as a regular single channel recorder), the BT-205 retains all the features of a 2-speed dual track recorder. Using the new "long play" tape, a total of 3 hours recording may be had on a 7" reel at slowest speed (1½ hours per side). The BT-205 does not have full track erase, only the track being recorded is erased.

OPERATION

TO RECORD - (monaurally)

1. Using Microphone - See Fig. 2 on next page. Press STOP key then turn on the recorder by rotating TONE control clockwise (notice click) and depress desired speed key. Allow 30 seconds for warm-up. Insert microphone plug into MIC jack located on right end of control panel. Next pull back on red button (RECORD LOCK) and depress record (REC) key. Tape will move and all sounds which are striking the microphone will be recorded on the tape IF THE VOLUME CONTROL is turned up sufficiently. The correct VOLUME control setting is that which causes the volume level lamp to flash (located underneath control knob). It is very important that the VOLUME control be turned up carefully until the lamp flashes only on loud peak sounds. If the lamp fails to light at all, volume is too low and if lamp flashes all the time volume is too high and must be turned down. Bright flashes of the light will also occur if someone talks too close to microphone and best results will obtain if microphone is kept about 12" away from speakers lips. The volume control should be from 1/2 to 3/4 of maximum setting. Avoid constant re-adjustment of volume during recording as this will destroy naturalness, a good method is to run a test tape ahead of time to get best volume setting.

This recorder always ERASES during recording so that any previous recording on a tape is always automatically erased just before the new material is recorded (i. e. the erase head is located ahead of the record-playback head).

Press STOP key to stop tape.

The recorder is not designed to make stereophonic recordings, as 2 complete recording amplifier systems would be required.

2. FROM RADIO, PHONO, AMPLIFIER or T. V. - See Figures 2, 3, 4, 5 & 6 - The most satisfactory way to record is to connect the radio input of recorder to the voice coil of the loudspeaker, see Figure 7. In the case of an AM-FM Tuner, connect to the tuner output where there are no tone controls in the circuit. If this is not feasible be sure tone controls are in flat position. Also - cut out any loudness controls since these accentuate bass and treble frequencies.

Several high-fidelity amplifiers now have tape recorder output connections which are unaffected by the tone control, for example, Bell Models 2285, 2300, 2315, 2325 and 2360. See Figure 5.

Adjust level control and make recordings as in paragraph 1. When finished recording, depress "Stop" key.

NOTE: In order to obtain best recording quality, the volume control on the BT-205 should be at a 50% setting or above when the recording level lamp flashes as described in paragraph 1 above. If the volume control, when recording, must be turned down to a low setting (say ¼ of the way up or 25%) to obtain proper flashing of the lamp it means that the signal being fed into the recorder is too high (from microphone, radio, phono or other source of sound). To avoid possible distortion, place the microphone farther away from the source, or turn down the volume of the radio or phonograph so that the RT-205 volume control can be advanced to 50% or higher for proper recording level.

**IMPORTANT - DO NOT ENTER THE BACK OF A T. V. SET TO CONNECT WIRES.
CALL A SERVICEMAN. DANGEROUS VOLTAGES EXIST INSIDE SET.**

3. DOUBLE TRACK - when recording has used up the full tape length, except a few turns of the supply reel (left hand side), turn reels over and exchange end for end placing the now full reel on the supply platform and the now empty reel (except for a few turns) on the take-up platform. Record as in paragraph 1 or 2.

Either track may be played back at any time by simply turning over reels and exchanging platforms.

REWIND - See Figure 1.

1. After recording is made, tape may be rewound by depressing "Rewind" key. When desired portion of tape is rewound, push down "Stop" key. Be sure keys are pressed all the way down. Wait for tape to stop before pressing "Play" key.

PLAYBACK - monaural

1. To play back tape recorded on the RT-205 or to play commercial pre-recorded tape, install reels on platforms and thread as for recording. Turn unit "ON", select correct speed, and depress "Play" key. Adjust volume and tone control to suit taste. When finished depress "Stop" key.

2. To play back the second track on a dual-track monaural recording turn reels over and place on opposite reel platforms. This may be done at any time during playback.

NOTE 1. Recording may be played back thru an external speaker by inserting a phone plug in the speaker jack. This jack when used, disconnects built-in speaker. (See Figure 8).

NOTE 2. Recording may be played back thru existing Hi-Fi system by inserting plug in amplifier output jack (see Figure 9). Recordings may also be monitored through built-in speaker. To silence internal speaker, insert a phone plug, miniature type, with no connections made to plug, into speaker output jack.

PLAYBACK - Stereophonic Tape

Thread the tape on the machine in the same manner as described above. Make a trial run and adjust the volume controls to produce a balanced, equal output from both channels. Do this with tone controls flat and standing midway

between the two loudspeakers. A good approximation is to listen to tape hiss before the music starts, adjusting for equality in both loudspeaker. A little experimentation will produce excellent results.

The stereo tapes should always be rewound back to the left-hand reel immediately after playing.

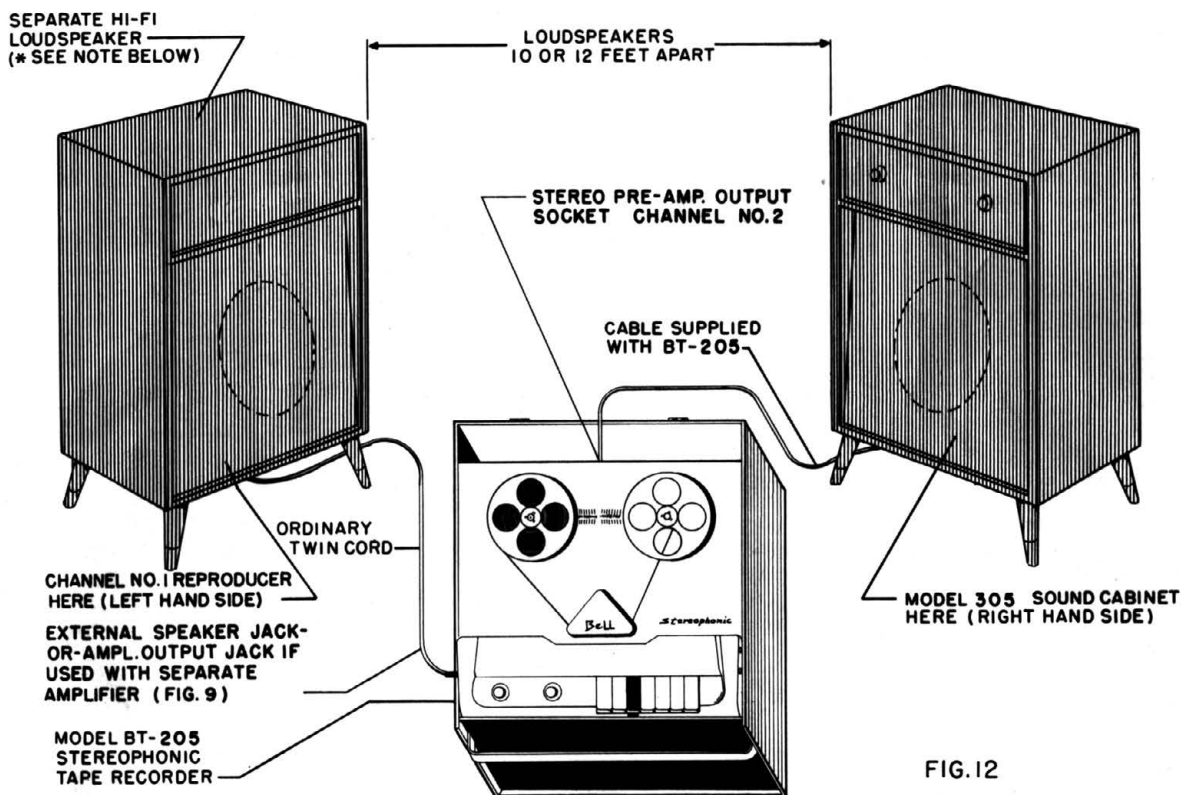


FIG. 12

***NOTE:** The separate loudspeaker shown above at left is not a necessary requirement since the #1 channel may be reproduced by the speaker in the BT-205 recorder. This diagram illustrates the recommended method of obtaining maximum results.

1. Remove the 8 ft. shielded cable supplied with the machine and plug one end into the BT-205 stereo pre-amp output (see Fig. 12). This is #2 channel.
2. Plug the opposite end into a Bell Model 305-D Sound Cabinet, or
 - (a) A Hi-Fi amplifier - use the auxiliary, radio, tape or T. V. input.
 - (b) A T. V. set - use the phono input.
 - (c) A record player or combination radio, record-player - use the auxiliary or external input.
3. The #2 channel should be reproduced on the right hand side, the #1 on the left. The #1 channel will be reproduced through the loudspeaker in the BT-205 recorder, unless a separate external speaker is plugged into the external speaker jack as shown on Fig. 8 below. Inserting the plug will silence the speaker in the BT-205. If desired, for still finer results, another external amplifier can be used to reproduce the #1 channel in the same manner as for the #2 channel above, by using the (external) amplifier jack as shown in Fig. 9. In this case, only the pre-amplifier in the BT-205 is used and the volume control on the BT-205 should be turned to zero, thus eliminating any distortion that might occur in the output section of the BT-205 amplifier.

The Bell Model 305D is ideal for reproducing the #2 channel externally - also the #1 for finest results - because it is designed to match the output of the BT-205 recorder and provides a convenient floor stand for the recorder with matched styling.

It will be found that there is no fixed rule for placement of loudspeakers because there is no "standard" for recording stereo tapes. Large orchestral groups or theater organs usually sound best with widely separated loudspeakers. Small groups, combo's and where soloists appear sound more natural with closer spaced loudspeakers.

It is not necessary for both loudspeakers to be identical but best results are had if both are of similar type, i. e. single cone, 2-way, etc. Both channels should be capable of reproducing the full frequency range as nearly as possible since fidelity will improve with increased range as in single channel reproduction. However, experience has shown that restrictions in response will not be nearly as evident with stereo as with monaural reproduction.

FAST FORWARD -

1. In playback, it is sometimes desirable to skip portions of tape to a particular spot. To do this, push down "Forward" key until tape arrives at desired spot; then depress "Stop" key. Be sure keys are pressed all the way down. Wait for tape to stop before pressing "Play" key.

SPEED - Either $7\frac{1}{2}$ inches per second or $3\frac{3}{4}$ i. p. s. tape speed may be used by pressing the desired speed key. Use $3\frac{3}{4}$ for more recording time on the tape. Use $7\frac{1}{2}$ for maximum recording quality. Always play back at same speed as used for recording.

ERASE ONLY -

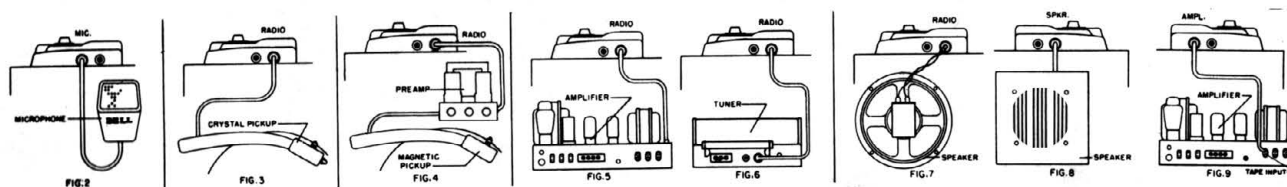
1. When erasing tape only, (no new recording being made) set up recorder the same as for making a recording, except turn volume control to minimum (full counter clockwise).

MONITORING RECORDINGS -

1. Any signal being recorded may be monitored by plugging high impedance headphones into the "Amplifier" jack. Low impedance phones may be plugged into External Speaker output jack.

An amplifier may be used to monitor any signals being recorded if connected to "Amplifier" jack. An external Speaker may also be used. Use Speaker output.

NOTE: When using a microphone and monitoring with External Speaker or amplifier, loudspeaker must be some distance away, otherwise a feed back howl will result.

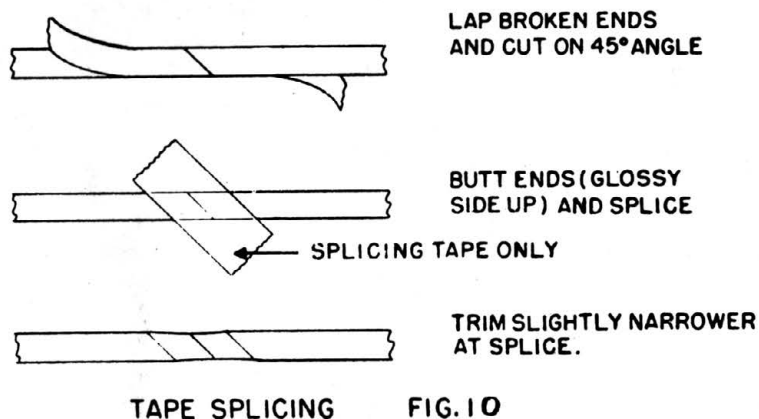


FOR RECORDING

FOR PLAYBACK

TIPS FOR BETTER RECORDING AND PLAYBACK

1. CONNECTIONS - See Figures 2 to 9 for various input and output connections. These should be self explanatory.
2. CARE OF TAPE - Do not leave tape on the recorder when not in operation. Heating tape may make erasing difficult. Store and use tape in temperatures of 70° to 80° for best results. Normal room temperatures with normal humidity is best. If tape becomes brittle, moisten a blotter and store with tape in tightly covered can for several hours.
3. SPLICING TAPE - Use only special splicing tape for best results. Cement and other regular adhesive tapes will "ooze" out over edges which causes layers to stick together. In recording or playback tape will jerk and cause jumpy and uneven reproduction. Do not handle tape with dirty or sticky hands. Keep covered when not in use. (See Fig. 10).



TAPE SPLICING FIG. 10

4. VENTILATION - Do not store anything in storage compartments while operating recorder. This will cut down ventilation and recorder may heat up. Tape stored there may become over heated making it brittle and difficult to erase. Rubber feet on bottom of case are intended to hold recorder above table top so that cool air can enter bottom vent grille. Do not obstruct grille.

5. CLEANING HEAD - After five or six hours of operation, or if recordings seem weak in high frequencies, inspect the black shiny bakelite surface of the record-playback-erase head for pile-up of dirt and oxide. If dirty, clean with petroleum solvent or head cleaning solvent, (or carbon tet if used sparingly and wiped dry after applying). For cleaning, use pipe cleaners or Q-Tips soaked in the above solutions (See Fig. 1 for location of head). Do not touch delicate head surface with metal object.

6. CLEANING CAPSTAN DRIVE - After several hours operation it may be necessary to clean the capstan and rubber pressure roller (See Fig. 1 for location). Use above mentioned cleaners on rubber roller and wipe dry immediately. DO NOT USE CLEANING FLUID ON METAL CAPSTAN AS IT MAY RUN DOWN INTO BEARING. Wipe with clean cloth only.

NOTE: Your recorder has been completely tested and adjusted at the factory. If it should fail to operate satisfactorily we suggest that the tubes be checked first. Access to tubes has been made easy by the removal of cabinet bottom cover.

CAUTION - Before removing bottom cover turn unit off and pull power cord out of socket. If tubes are changed, it may be necessary to readjust the hum balance control. To do this, disconnect microphone, radio, etc. and turn the volume on full. Adjust for minimum hum. Sometimes reversing the line cord plug in the socket will help reduce hum.

For further service work, the machine should be packed carefully and sent to an authorized repair station. Contact the factory for the name and address of the nearest authorized Bell Service Station.

LUBRICATION: Your recorder has been lubricated at the factory and should give you many hours of pleasurable service without further attention. If it is used extensively, however, a drop of good grade oil may be added to the bearings. When oiling the capstan bearing be careful to wipe the excess oil completely off of the capstan shaft and pressure roller.

PARTS LIST

REF. NO.	PART NO.	DESCRIPTION
R1	B20066P106	Volume Control, 1 meg.
R2	B20066P108	Tone Cont. and On-Off Switch, 500 K C
SP1	B20111P29	Speaker, P. M. ; 5 1/4 inch Round
L1	B23704	Bias Osc. Coil
M1	B20107P10	Selenium Rectifier
M4		Neon Lamp, # NE-51
M5	B25251	Function Switch
M6	A25342	Leaf Switch, "Memory" Braking Switch
	A25328	Reel Platform, Supply
	A25328	Reel Platform, Takeup
	B25292 (BT205IB Only)	Head Cover
	B20148P51	Tone Control On-Off Knob
	B20148P51	Volume Control Knob
	D25291	Cover Plate
	A25319	Head Cover Bracket
	A23822	Retaining Ring
	A23763P2	Nylon Washer
	A25315	Slide Bearing
	A25270	Pressure Roller Spring
	A25331	Felt Pad
	A25265	Tape Guides
	A25391	Record Latch Ass'y
	A25268P1	Key (6 used)
	A25268P2	Record Key (red)
	B20089P58	Fibre Washer (13 used)
	B25400P2	Take-up Motor
	B25400P1	Rewind Motor
	A25399	Gasket
	A25394	Capstan Lever Weld Ass'y
	B25390	Capstan Shaft Ass'y
	A25397P1	Motor, Spring
	B25388	Capstan Motor Assembly
	A25395	Capstan Motor Support Assembly
	A25397P2	Motor, Spring
	A25382	Capstan Motor Support
	B25381	Capstan Yoke
	A25257	Flywheel Assembly
	36X1 (BT205IB Only)	Head, Tape - 2 channel rec/PB w/shield
	36X2 (BT205IB Only)	Head, Tape - erase
	54A1	Jack, Pin
	72B11	Support, Capstan
	72A13 (BT205IB Only)	Bracket, Head Mounting
	A30007P1	Cable Assem., Output
	96P5	Instruction Manual
	91X7	Pre-Amp. Assembly (complete)
	91A9 (BT205IB Only)	Head Spring Ass'y
	91B8 (BT205IB Only)	Pressure Roller Lever Ass'y
	B23727P2 (BT205OB Only)	Head, Tape
	36X (BT205OB Only)	Head - #2 channel
	72A14 (BT205OB Only)	Bracket, Head Mt'g
	91B16 (BT205OB Only)	Pressure Roller Ass'y
	71A1 (BT205OB Only)	Head, Plate
	91A13 (BT205OB Only)	Spring Ass'y, Rec-Play
	91A14 (BT205OB Only)	Spring Ass'y, Erase
	91A15 (BT205OB Only)	Spring Ass'y - #2 channel
	72A15 (BT205OB Only)	Clamp Head Retaining
	72B21 (BT205OB Only)	Cover, Head

BT-205IB (inline)
BT-205OB (offset)

MINOR CHANGES MAY BE MADE FROM TIME TO TIME WHICH DO NOT APPEAR IN THIS SCHEMATIC.



I. M. # 96P5