GX-HEAD

GLASS AND X'TAL FERRITE HEAD

A TAPE RECORDING DREAM·····THE IDEAL GX HEAD

Can AKAI possibly apply their VTR Engineering Researcher's most preciously perfected head to Audio Tape Recorders?

AKAI, who has for many years sold tape recorders in every nook and corner of the world, in order to maintain its reputation of quality, has developed and perfected the GX (Glass and Crystal Ferrite) Head.

This All-New GX-Head will always, regardless of the severest of environments, produce magnificently clear and beautiful playback sound of your recorded chronicles.

AKAI®

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In order for tape recorders to operate with uninterrupted stability, whether in the torrid countries of Africa or the frozen regions of the South Pole, it is important, beginning with the motor, that the recorder parts be designed to sufficiently endure any environment. As all sorts of tapes come directly in contact with the head surface, the head is of special importance. An ideal head is wear free, dust free, and made of the finest quality materials.

At AKAI, this "ideal" head has been perfected for employment in AKAI's VTR Equipment. This new GX-Head is the first in the world to be made of material with such a high degree of hardness (crystal ferrite and glass). The difficult problems of improving this discovery for adaption to audio recording have also been solved. Heads to date have been made of metal, but for the AKAI GX-Head, the gem "crystal ferrite" is used for the core, and with jewel-like precision is mounted and set in glass. This produces a permanently "wear free" head surface to which dust will not adhere.

DUST FREE

Heretofore, parts of the head which come in contact with the tape were molded of layered metallic foil. Because of this, tapes which had been used several times previously and tapes used under conditions of high temperature and humidity, etc. were easily damaged. Particles of dust, etc. from such tapes piling up and adhering to the vicinity of the head was a major source of trouble.

AKAI's engineering department has devoted extensive research to the tape contact portion of the head and as a result developed the GX-Head for use in AKAI VTR Tape Recorders. They discovered that Crystal Ferrite and Glass contained ideal friction characteristics. For actual use of crystal ferrite for audio heads, further improvement was made, and due to the strictest circumference conditions, they were successful in developing a head of which the perfect surface condition is permanently maintained. That is to say, the head-to-tape contact point of the GX-Head will remain completely stable and promises the highest quality recording and playback permanently.

The two pictures (at right) show the construction of the crystal ferrite head and the conventional permalloy head respectively. For comparison the pictures are magnified so that the perfectly straight line of the GX-Head Gap can be seen between the ferrite core.

Fig. 3 clearly shows the frequency response line of the old type head to which dust adheres as compared to that of the new GX-Head. The change in performance of the GX-Head even under perverse conditions of high temperature and humidity is practically nil.

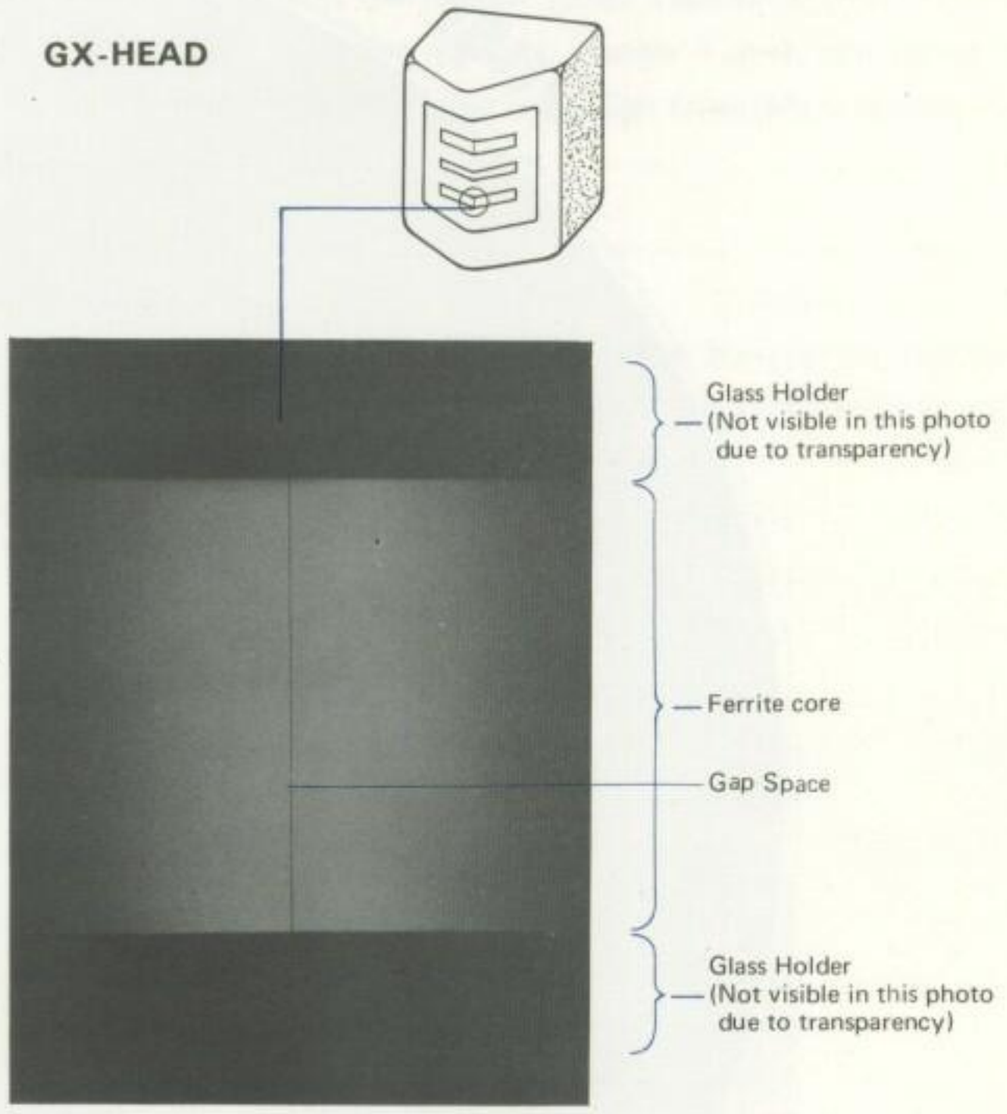


Fig. 1.

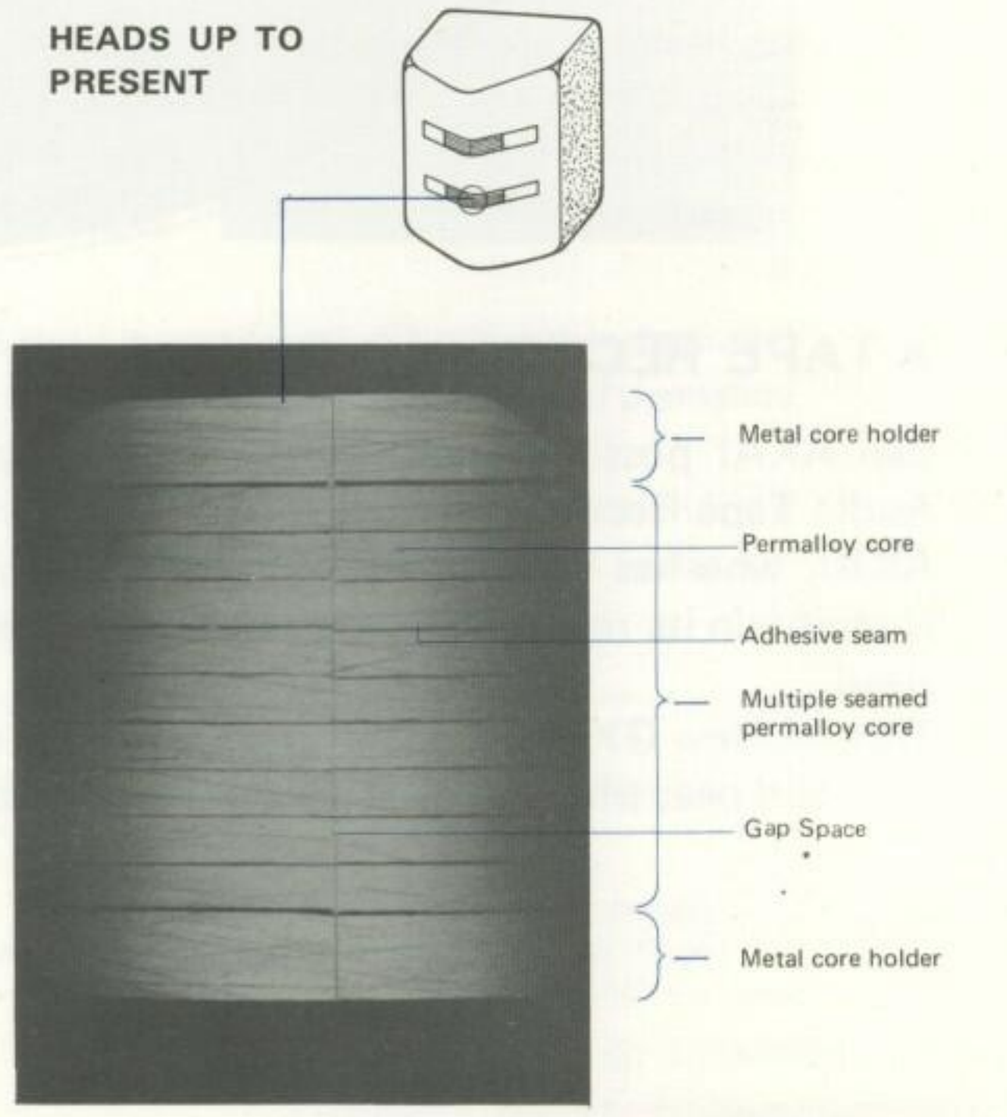


Fig. 2.

Fig.1 . Fig.2 Comparison of Construction (micro-photograph of head gap)

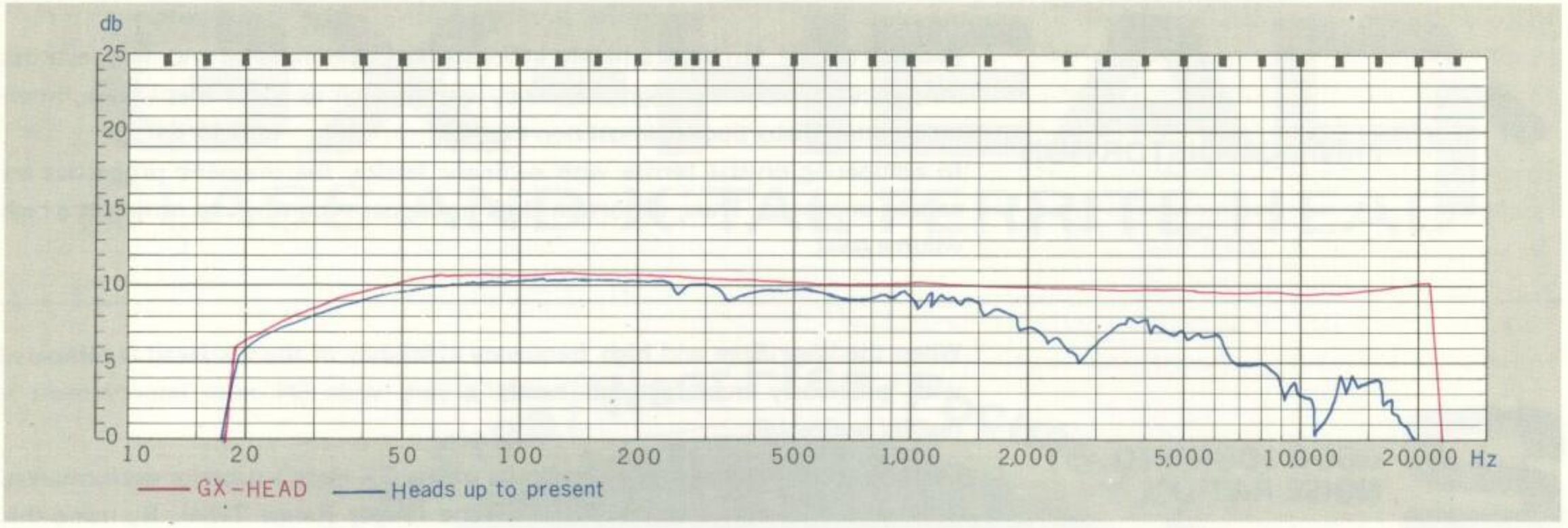


Fig.3 Change in the Characteristics of Frequency Response due to Adhesion of Dust (using tape of inferior quality at 40°C (104°F), 85% humidity)

WEAR FREE

As previously mentioned, because of the degree of hardness of this X'tal Ferrite and Glass constructed head, it surpasses any other in enduring wear. In comparison, the extent of abrasion of the GX-Head is dozens of times less than that of conventional heads. By using the GX-Head, we will no longer be plagued with the instability of tape movement as it passes over the head surface, or with problems of wear and abrasion. The diagrams below clearly indicate the difference in wear between heads to date and the GX (Glass & X'tal Ferrite) Head.

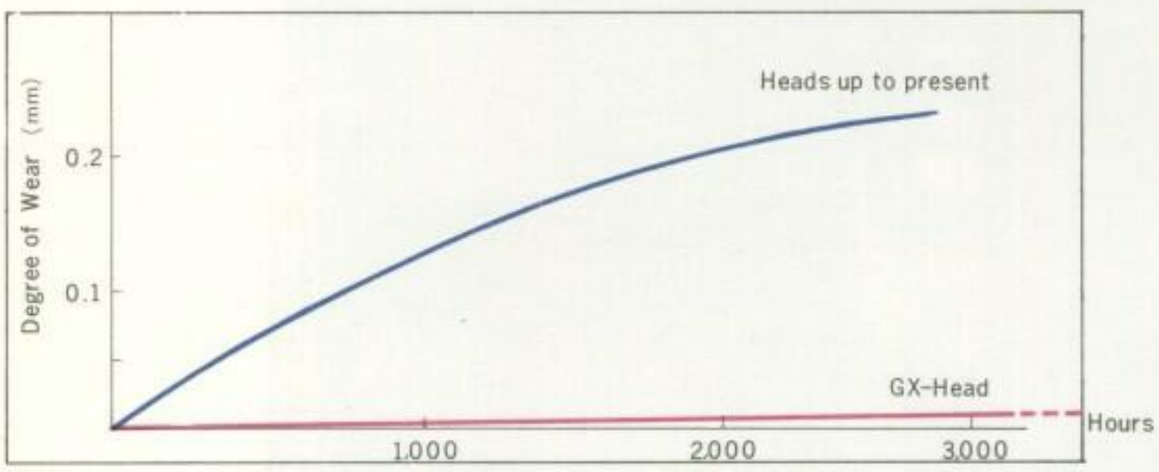


Fig.4 Comparison of Degree of Wear

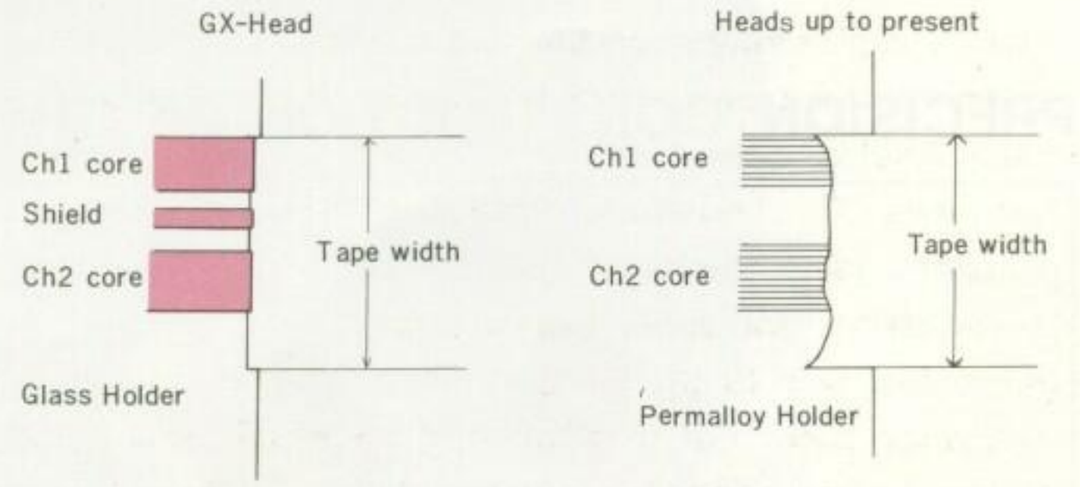


Fig.5 Degree of Head Surface Wear (Side view, after 1,000hrs. of use)

FOCUSED FIELD

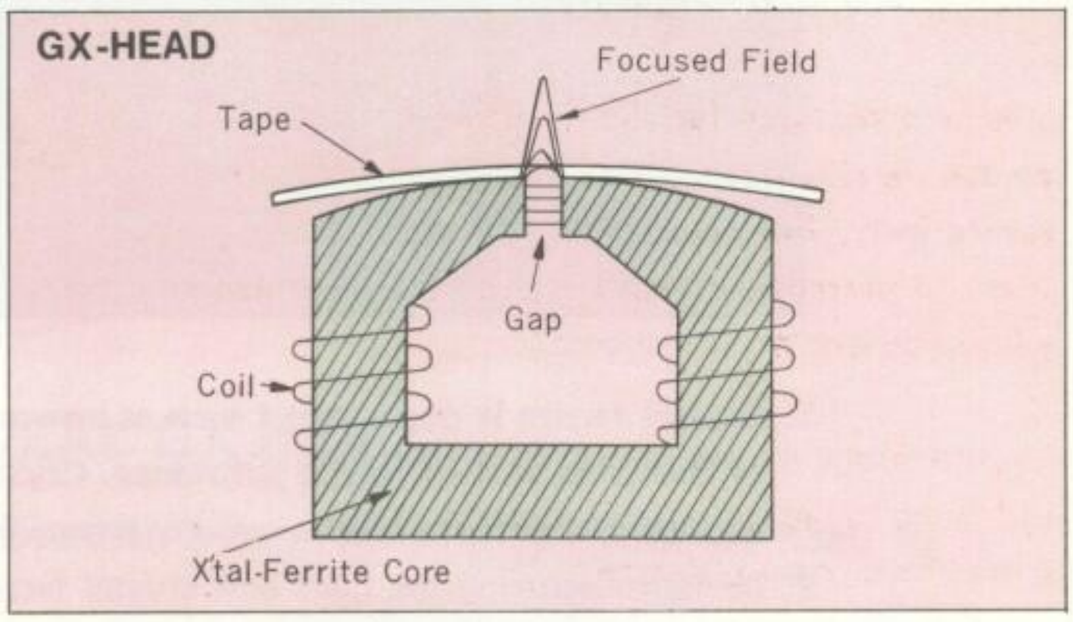
On conventional recording systems, when high frequency signals are being recorded on a tape, the signals are weakened by the prevailing influence of the bias current. As a result, the frequency response is not good and sound is not reproduced in all its true dimensions.

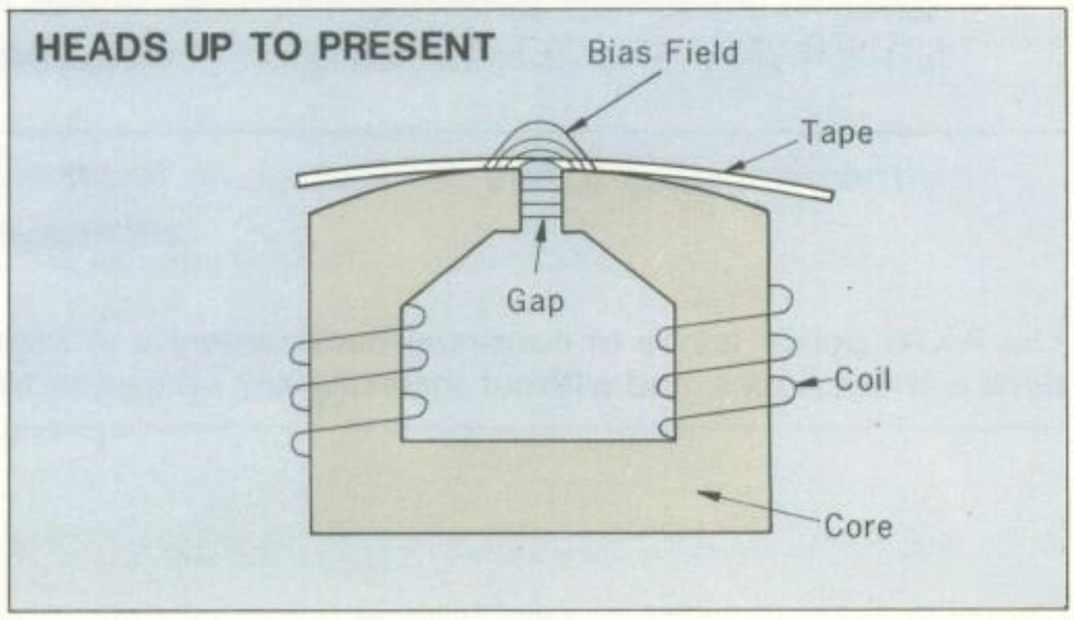
In order to solve this problem, in 1960, AKAI developed and put into practical use, the Cross-Field Recording System. In this system, the signal and bias heads were mounted separately so that the recorded signal was free of the influence of the magnetic bias field.

On the new GX-Head, the signal and bias is not separated. AKAI engineers were successful in focusing the magnetic bias field so that the influence of the bias is lessened.

The GX-Head's precision-made FOCUSED FIELD SYSTEM is a result of extended research for a head gap of advantageous width and depth for developing a recording head with a crystal ferrite core having an exactly adequate amount of magnetism to form the "focused field".

In addition to the three main features, DUST FREE, WEAR FREE, and FOCUSED FIELD, the following are also distinctive features of the GX-Head.





1 MINIMUM DISTORTION

Because crystal ferrite is a highly efficient magnetic material and demonstrates efficiency in recording high frequency signals such as audio bias signals, inter-modulation distortion is almost non-existent.
In comparing crystal ferrite with ordinary ferrite, the magnetic properties are widely improved. Thus, distortion does not occur even when recording at a high volume level.

2 GOOD SOUND TO NOISE RATIO

When the Wear Free and high frequency efficiency of the GX-Head is compared with previously manufactured heads, a very wide SN ratio improvement is readily noticeable.

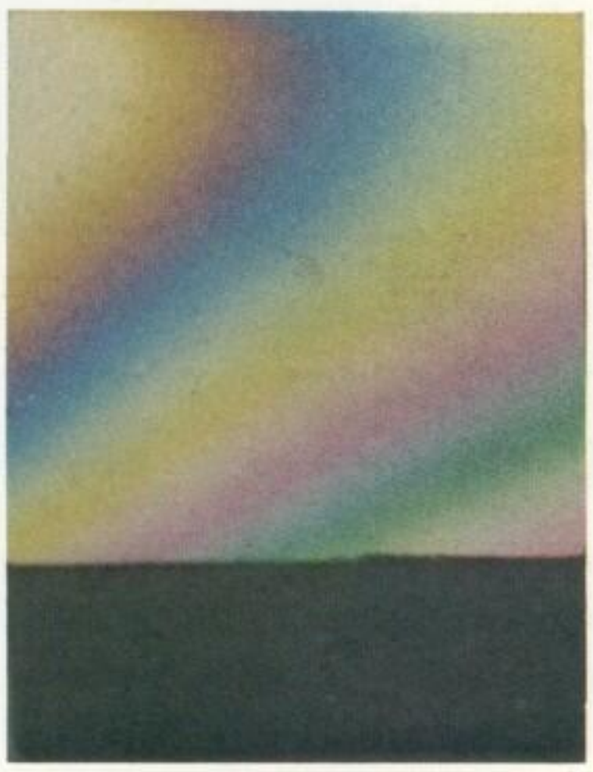
Further, to realize the maximum limits of the GX-Head's superior performance, AKAI has prepared a special "SRT" Tape (Super Range Tape). By using this wide range tape, the maximum frequency range and high frequency sound in all its clear brilliance can be fully enjoyed.

3 SOUND DOES NO FLUCTUATE AT LOW FREQUENCIES

The sharply contoured shape of the GX-Head permits low frequency signals to be recorded smoothly without distortion. 20 to 30 Hz super low frequencies can be recorded and played back with maximum stability.

PRECISION CONSTRUCTION OF THE "GX-HEAD"

1



2

1. Crystal ferrite is not a metal such as iron and copper, but a magnetic gem. The garnet and spinel is of the same sort of ferrite substance. Crystal ferrite is many times as hard as the metal permalloy and its percentage of wear is many dozen times less.
2. In manufacturing the glass and crystal ferrite head, precision measurement by the micron unit is required. A .1 micron optical flat is used for measuring the smoothness of the crystal ferrite surface. This "interference fringe" measuring system assures a super-finished surface.

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