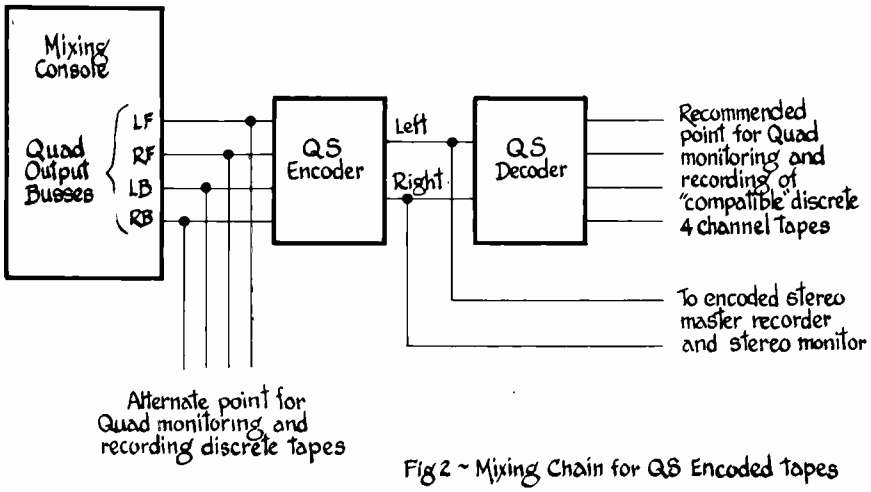

Fig 2 ~ Mixing Chain for QS Encoded Tapes

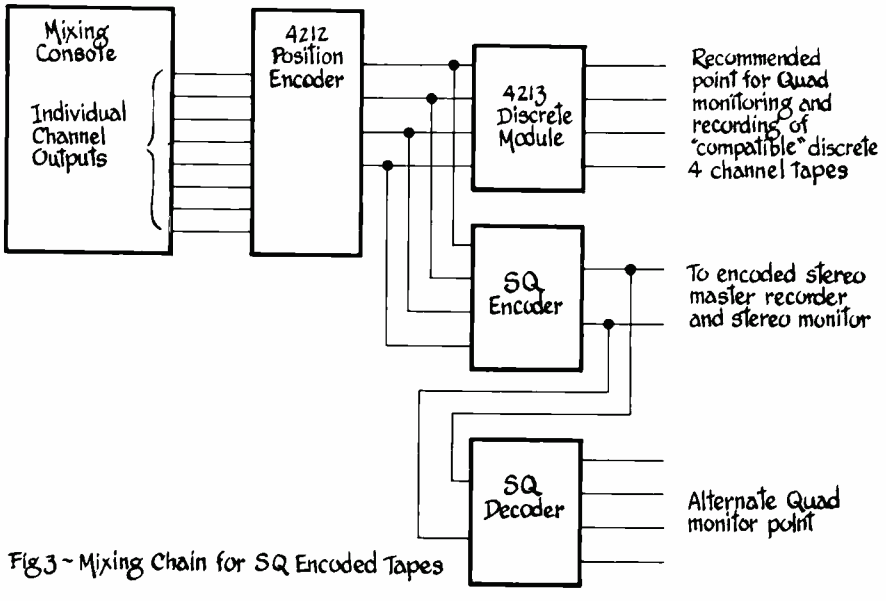

Fig 3 ~ Mixing Chain for SQ Encoded Tapes

nel placement of CD-4 permits a four track tape which has been previously mixed (such as for Q-8 cartridge release) to be transferred to a CD-4 disc without special remixing to correct the image placement.

Sansui's QS matrix offers virtually the same flexibility and accuracy as CD-4, insofar as encoding of existing four track tapes is concerned. ABC-Dunhill Records, for example, is making discrete four track tapes (for Q-8 cartridge release) by using the same mixes which are QS encoded for *Impulse* quad discs; they have observed no compatibility problems [15]. With the QS symmetrical matrix, a sound may be panned 360° or placed anywhere within that circle by conventional (sine-cosine) panning. Sansui does recommend monitoring the mix through their encoder and decoder so that optimum placement may be established for a particular mix. See Figure 2.

Columbia's SQ matrix claims the ability to allow direct quad encoding of existing four track tapes. Yet CBS literature describes an additional position encoding module which assists in making a quad product with more precisely controlled image placement. This device, an add-on module to the SQ encoder, is packaged as a set of eight special pan pots, with switching to allow two panning configurations. Special phase shifting circuitry in the CBS 4212 Position Encoder is required for optimal placement of any sound. When the position encoder is used to pan a sound, the level and the phase angle are modified so that the SQ matrix will yield the desired position after decoding. Because additional phase shift is introduced by the position encoder, the four channel output of the encoder represents a quad mix that is less than ideal for discrete tape release. Recognizing this situation, CBS offers their 4213 Discrete Module which corrects the phase so that a simultaneous encoded SQ tape and a tape suitable for discrete four track release may be obtained. See Figure 3. According to Jerry Budelman of CBS, the position encoder may not be used to optimize the placement of a previously mixed four track tape. Moreover, optimum placement of sound may only be achieved with the position encoder [16]. It would therefore appear that previously mixed four track tapes cannot be optimally encoded through the SQ system.

Phase reversal of any input on either an SQ or QS master will definitely cause incorrect image placement. However, this will be immediately obvious if the mix is monitored through the encoder and decoder, as is recommended for both systems. Although such a phase reversal will not cause incorrect channel placement on a CD-4 master, it will shift the image of the perceived sound. Therefore the phase of any recording and playback system is critical to good quad sound (which is also true of stereo).

We feel it is important to note here that Sansui has maintained the same encoding scheme since its introduction in 1969. The only improvements have been in the decoding, and these have not changed the relative image location of previously recorded material. SQ has presented several encoding schemes, and when asked about specific changes, they replied that the SQ 4/2 code has not been changed since its introduction. However, the SQ code specifies only center-front, center-back, and corner encoding data, and it appears that some modification of the sides and other areas is possible without violating the SQ code. CBS further appears to draw a distinction between "correct" encoding, which we understand to be that which satisfies the SQ code, and "proper" encoding, which we understand to be that which will be decoded and perceived in the intended (optimum) location [17] [18].

STEREO COMPATIBILITY

The viability of a quad system depends upon good stereo compatibility. Yet what is meant by compatibility is not clearly defined. There are three major aspects to compatibility of a quad disc, with respect to stereo (or even mono) reproduction; fold-up compatibility, physical playback compatibility, and artistic playback compatibility.

The artistic aspect is important because music mixed for four channel reproduction does not always sound good when it is played through one or two speakers, regardless of the method used to reduce it to fewer speakers. Just as stereo recordings are monitored and mixed with some compromises to increase mono compatibility, so apparently must compromises be made with quad recordings. The nature and extent of these