

**F.M.STEREO TUNERS**  
**R51 and R21**  
**PROVISIONAL DATA SHEET**

*This is to announce a new F.M. stereo tuner from J. E. Sugden. It is of advanced design with several novel features and is available in two forms, each one to match the C51 and A21 amplifiers respectively.*

## **SPECIAL FEATURES**

- 'Thermometer' style tuning dial for easy reading
- four pre-set tuning positions as well as normal manual
- high sensitivity and selectivity
- special decoder circuit to reject 'warbles' and 'birdies'
- stereo noise filter to reduce stereo switching noise on weak or poor transmissions



**R51** stereo F.M. tuner



**R21** stereo F.M. tuner

The tuners have a front end which is varicap (electronically controlled variable capacity diode) tuned using two dual gate FET's which permit optimum performance in regard of overload levels and cross modulation reduction. A single tuned antenna circuit is followed by an FET RF amplifier followed by a band pass double tuned circuit to the mixer.

The I.F. strip uses conventional components as opposed to I.C.'s as it is felt that no advantage to the user can accrue from I.C.'s in fact the reverse could be the case. The I.F. strip is however 4 stage and uses double tuned coupling between each stage. The ratio detector is equipped with a preset control to balance it accurately in order to obtain maximum AM rejection.

The decoder is in our opinion the most important part of a good FM stereo tuner. The R51 and R21 tuners incorporate a decoder of advanced specification. The preliminary amplifier incorporates a low pass filter cutting off very rapidly above 55 kHz. The L+R information is the 'compatible' section occupying the band 0 - 15 kHz and the L-R information is carried on two side bands of 15 kHz on a 38 kHz subcarrier and thus occupies the band  $38 \pm 15$  or 23 to 53 kHz. There is absolutely no point in passing frequencies above the upper limit of 53 kHz. The design of FM detectors however in order to allow the 75 kHz deviation products almost always allows a wider than necessary A.F. band width and can thus permit adjacent channel or interference beating with the subcarrier or pilot tone, or detection in the decoder to cause the warbling noises or 'birdies' so hated by many stereo radio listeners. The B.B.C. in their engineering bulletins have recommended the procedure adopted in the J. E. Sugden tuners. We know of no other tuner at this present time with the necessary filter incorporated (SCA filters help but they are band stop not low pass). There is also a switchable filter permitting reduction of the L-R information. This is our 'stereo noise filter' and results in a considerable reduction in switching noise from distant or poor stereo transmissions at the expense of a reduction in separation. The reduced separation gives an impression of a slight narrowing of the effective stage.

The output buffers provide a low impedance output permitting long lengths of screened cable to be used without degrading the HF performance and they also include low pass filters and 19 kHz band stop filters to prevent the 19 kHz and 38 kHz components being passed and causing problems in tape recorders which may be connected.

## CONTROLS AND CONNECTIONS

### FRONT PANEL

- push buttons:** 1) *four combinations of two buttons for*  
2) *four pre-set tuning positions*  
3) *manual/pre-set selector*  
4) *interstation muting*  
5) *automatic frequency control*  
6) *stereo noise filter*  
7) *mono only*  
8) *mains on/off*
- knobs:** *i course tune*  
*ii fine tune*
- meter:** *centre zero tuning meter*
- lamp:** *indicates stereo transmission. It is not turned out when mono operation is selected.*

### REAR PANEL

- aerial connections:** *75 ohm coaxial*  
*300 ohm twin terminal*
- outputs:** *1 DIN socket*  
*4 phono sockets (2 for each channel to permit direct connection of auxiliary recorder).*
- mains:** *input plug*  
*outlet socket (provides additional outlet as one outlet in amplifier will be 'blocked' by tuner).*

## PERFORMANCE DETAILS

- frequency range** *88 - 104 MHz*
- frequency response** *± 1 dB 30 Hz - 15 kHz*
- sensitivity** *2.0 µV for 30 dB quieting*
- antenna impedance** *75 or 300 ohms*
- separation** *better than 30dB*
- switching residuals** *negligible*
- output** *0.5 volt*
- distortion** *less than 0.25% average modulation*
- IF rejection** *80dB*
- image rejection** *70dB*
- alternate channel selectivity** *60dB*
- AM suppression** *50dB*
- capture ratio** *3.0dB*
- AFC ratio** *5 : 1*
- dimensions** *R21 in wood case: 12" x 9" x 5"*  
*(300 x 130 x 230 mm)*  
*R51: 11" x 3¾" x 6¾" (280 x 95 x 170 mm).*

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