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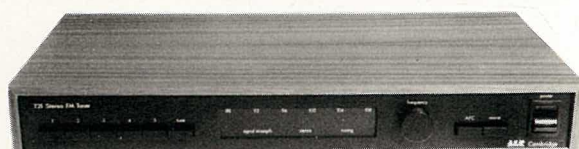
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The T21 FM Tuner



Owner's Handbook

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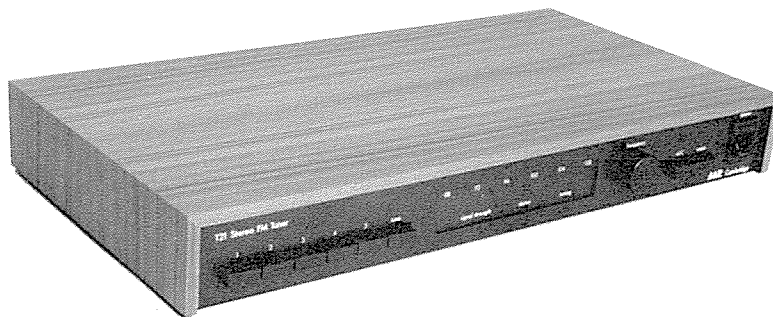
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Introduction

The T21 Stereo FM Tuner has been designed to provide the best possible sound quality from both stereo and mono FM radio broadcasts. It blends unobtrusively with domestic surroundings and is an ideal partner for the A & R Cambridge A60 Amplifier.

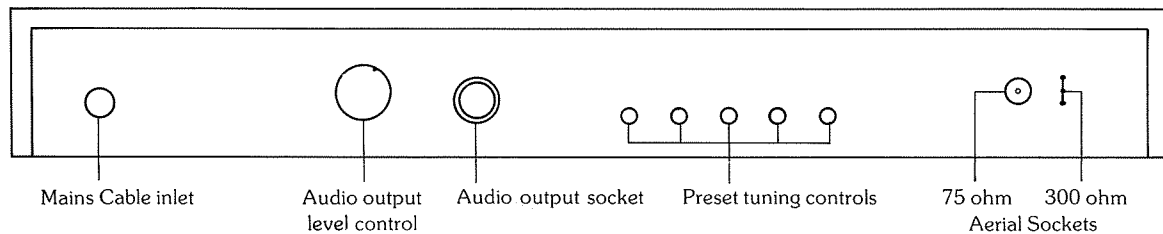
The Tuner has a manual tuning control and also five adjustable preset buttons which, once set, allow immediate switching from one station to another. The tuning scale consists of a row of 21 LED's (light emitting diodes) and the signal strength, mono/stereo reception and tuning accuracy are also indicated by LED's. The T21 incorporates an AFC switch, and a birdie filter to reduce unpleasant whistles arising from adjacent channel stereo broadcasts.

Please study this manual carefully to ensure that you get the best results from your tuner. Remember, your dealer is there to help you - he has been specially selected for the high quality of his after-sales service. Your local aerial contractor can advise you on suitable aerials for reception conditions in your area. If you have any unresolvable problems, do not hesitate to contact us directly.



Installing and using your T21

Back Panel Connections



Mains Supply

The Tuner is normally set up for use with a nominal 240 volt 50/60Hz supply. It can be modified for a nominal 120 volt supply by your dealer or by the manufacturer.

The mains lead should be terminated with a three pin (earthed) plug fitted with a two amp fuse. A 100 mA anti-surge mains fuse (same fuse in 120 volt models) is fitted internally. It is recommended that the supply to the T21 be disconnected whenever the tuner is not in use

Under no circumstances should the tuner cover be removed unless the supply is disconnected at the wall socket.

Do not put excessive strain on the mains cable fixing either at the tuner or at the plug.

Audio Output Level Control

The audio output level control alters the level of the audio output signal fed into your amplifier so as to obtain a reasonable listening level with your amplifier's volume control at its normal setting.

Audio Output

The output is available on a five-pin DIN socket. The standard wiring is used (left on pin 3, right on pin 5, earth on pin 2) so that a standard 5-pin DIN plug lead can be used to connect the T21 into your amplifier.

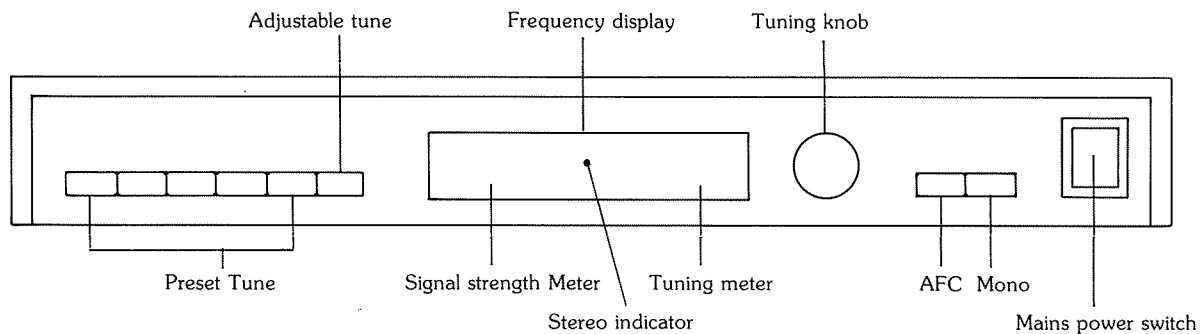
Preset Tuning Controls

The five preset tuning controls adjust the frequencies to which the five preset buttons are tuned. See facing page for details of how to set to the stations you require.

Aerial Sockets

75 ohm ('TV Coax') and 300 ohm (balanced feeder) aerial sockets are provided. See page 4 for details of aerials and aerial connections.

Front Panel Controls and Displays



Mains Power

The Tuner is turned on by the mains power switch. It is good practice to turn the Tuner off when it is not in use.

Frequency Display

The frequency display consists of 21 red LEDs spaced at intervals of 1 MHz. As the tuning frequency is increased the illuminated point moves from left to right. The illumination fades in and out between LEDs so that when two adjacent LEDs are equally bright the tuning frequency is midway between the frequencies indicated by those two LEDs.

Signal Strength Meter

The signal strength is indicated by a row of five LEDs at the bottom left of the display window. The first two LEDs are red and the next three green. As the signal strength increases more of the LEDs are illuminated. When only the red LEDs are illuminated the signal is too weak for adequate stereo reception: the first green LED indicates that reception is just adequate for stereo.

Stereo Indicator

The single red LED in the centre of the display indicates that the broadcast is in stereo (and that the tuner is not switched to mono).

Tuning Meter

The three LEDs at the bottom right of the display are for accurate tuning. The central green LED will be illuminated when the Tuner is accurately on station: when either of the adjacent red LEDs is illuminated the Tuner is slightly off tune. The green LED will also be illuminated when tuned far away from any station).

Preset Frequencies

Five adjustable presets are provided for tuning to the stations you use most regularly. To tune a preset, depress the appropriate button (1-5) and adjust the corresponding preset control on the back of the Tuner (see page 2) - the presets are sequential, the left hand preset as viewed from the front corresponding to button 1. All the displays are operative when using and adjusting the presets. It is advisable to allow the Tuner to warm up for at least thirty minutes before setting the presets to avoid subsequent drift.

Once the presets are set, you may switch between stations simply by depressing the appropriate button.

Adjustable Frequency

When the sixth button (marked tune) is depressed the frequency can be controlled by turning the multiturn knob to the right of the display window. Interstation noise is automatically muted during tuning (except when switched to mono - see below). Again, the tuning displays are all operative.

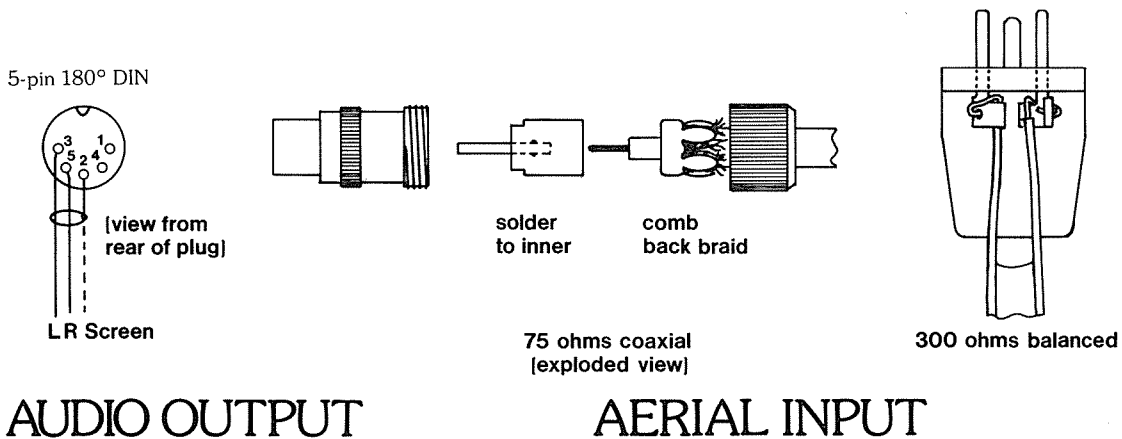
AFC (Automatic Frequency Control)

With the AFC button depressed the Tuner is automatically held to the frequency of the selected station. When adjusting the tuning, the AFC button should be in the out position, the button being depressed again when the correct station has been selected to ensure minimum distortion and to avoid drift.

Mono

If reception of a stereo signal is poor, depression of the mono button will switch the Tuner into mono operation and improve the quality of the reception. If you operate the frequency controls with the mono button depressed you will notice that the interstation noise is no longer muted. This is perfectly normal, the system being designed to allow reception of very weak signals when the Tuner is in mono mode.

Connector Wiring



Audio Output

A standard 5-pin 180° DIN plug to 5-pin 180° DIN plug lead should be used for connection to an amplifier with a DIN-socket tuner input. (A high-definition DIN to DIN lead using silver-plated plugs and a high quality cable, and of the correct length for mounting a T21 above an A60 Amplifier is available from your A & R Cambridge dealer as an accessory). If your amplifier has phono or other input sockets, then the 5-pin 180° DIN plug for the tuner output should be wired up as illustrated, with connectors on the other end of the lead to suit your amplifier.

Aerial Input

With a 75 ohm aerial, you should use the coax (75 ohm) aerial input: with a 300 ohm aerial the 300 ohm (balanced feeder) aerial input should be used. In the UK most aerials are of 75 ohm impedance. In either case, the appropriate plug should be wired as illustrated.

Technical Details

Spares Kit

You are provided with:-

75 ohm ('TV Coax') aerial plug
300 ohm (balanced feeder) aerial plug
5-pin 180° DIN plug for the output socket
Allen key (1/16" A/F) which fits the screws in the output level and frequency tune knobs.

Fuses

The T21 has two internal fuses, a 100 mA anti-surge (the same in 120V models) mains fuse, and a 250 mA. quick blow DC fuse. Neither of these is user replaceable and if either blows there is a fault and you should return the tuner to your dealer for repair.

Aerials

In order to obtain noise-free reception with freedom from interference from car ignition and the like, it is important that the tuner be presented with the best possible input signal. This is the function of the aerial and its downlead.

On the continent 300 ohm "balanced feeder" wiring is quite popular but in the UK most aerials are designed to be used with 75 ohm unbalanced co-axial cable as a downlead. Wiring diagrams for these are shown on page 4

Unless the T21 is sited within a very few miles of a major transmitter it is essential to install a proper aerial designed for "Band 2" (VHF/FM) reception. This may be put in the loft or preferably outside the house, mounted as high up as possible. As a very rough guide a simple dipole is probably adequate up to about 15 miles from a transmitter and a 3 element aerial is suitable for reception up to about 40 miles. Beyond 60 miles specialist 6 or even 8 element aerials become desirable. You should note that multi-element aerials are very directional and need to be "beamed" carefully towards the transmitter. If good reception from different directions is required, then an aerial rotator may be necessary.

Finally, attention must be paid to the quality of the co-axial cable used for the downlead to the tuner. Avoid joins along the length of the cable and ensure that the exposed end at the aerial is properly weatherproofed against the ingress of moisture. All cables lose some signal along their length and it is a false economy to use cheap cables of unknown quality -specify the very best "low loss" co-axial cable.

Using the above notes for guidance it is possible to carry out a proper aerial installation oneself. However, it is very likely that your local aerial contractors will have an intimate knowledge of local reception conditions and it is usually best (and safest!) to consult them before proceeding. They are not normally expensive and your A & R (Cambridge) dealer should be able to recommend one. If he is unable to help, a list of such firms may be found in the "Yellow Pages" section of your telephone directory under "Television and Radio Aerial Contractors"

For further information the BBC publish a 19 page booklet called "How to get the best out of BBC stereo Radio", which includes details of all BBC transmitters in the UK together with much other useful information. This may be obtained on request by sending a large Stamped Addressed Envelope to

B B C
Engineering Information Department
Broadcasting House
LONDON
W1A 1AA
Tel: 01-580-4468 ext 2921

The IBA also publish a leaflet with full details of all independent local radio stations -this may be obtained from

IBA
70 Brompton Road
LONDON
SW3 1EY
Tel: 01-584-7011

If you experience significant interference with radio reception then the Post Office operates an advisory service. In the first instance you should obtain the leaflet "Good Radio and T.V. Reception" from your local post office and fill in the form A6328 ("Request for Investigation") supplied with this. This should be returned to the General Manager of your Telephone Area Office who will arrange further action.

Specification

Tuning Display

Tuning Scale

In steps of 1MHz, using 21 matched red LEDs arranged as a moving pointer. There is a gradual changeover in light output between adjacent LEDs, allowing the interpolation of frequency readings to better than 0.5MHz.

Tuning Scale Accuracy

Within ± 200 kHz of indicated reading.

Signal Strength Meter

Bargraph scale using 5 LEDs, 2 red then 3 green. The stereo signal-to-noise ratio is adequate when the first green LED is on. Saturation (all LEDs fully on) occurs at approximately 2mV aerial signal.

Tuning Meter

3 LED type: red-green-red. Correct tuning occurs when only the green light is on.

Stereo Beacon

Single red LED.

Technical Specification

Tuning Range

87.5 to 108.5MHz

Aerial Inputs

Sockets for 75 ohms and 300 ohms aerials

Sensitivity (I.H.F.)

Typically 2.0uV (note 1)

-3dB Limiting Point

Typically 1.5uV (note 1)

Capture Ratio

1.5dB

Alternate Channel Selectivity

Better than 60dB

Repeat Spot Suppression

Better than 80dB

I.F.Rejection

Better than 80dB

A.M.Suppression

Better than 50dB (note 2)

Ultimate S/N Ratio (CCIR/ARM)

MONO - Better than 70dB
STEREO - Better than 68dB

Pilot Tone Suppression

Better than - 50dB (note 1)

Subcarrier Suppression

Better than - 40dB (note 1)

Distortion (T.H.D.), 1kHz

MONO - Better than 0.15% (note 3)
STEREO - Better than 0.25% (note 3)

Channel Separation

Better than 35dB (note 3)

Frequency Response

20Hz - 12kHz \pm 0.5db, typically - 3dB at 15kHz

Channel Balance

Within \pm 1dB

Output Level

Continuously variable: 8mV - 800mV at full deviation

Output Impedance

Less than 1k ohm

Technical Specification

/Continued

Recommended Load

Greater than 10k ohms

Output Socket

5 pin, 180° DIN type, signal on pins 3 and 5.

Power Requirements

200 - 250 Volts AC only, 6VA (100 - 120 Volt AC model to special order)

Overall Dimensions

Height 60mm, Width 450mm, Depth 240mm

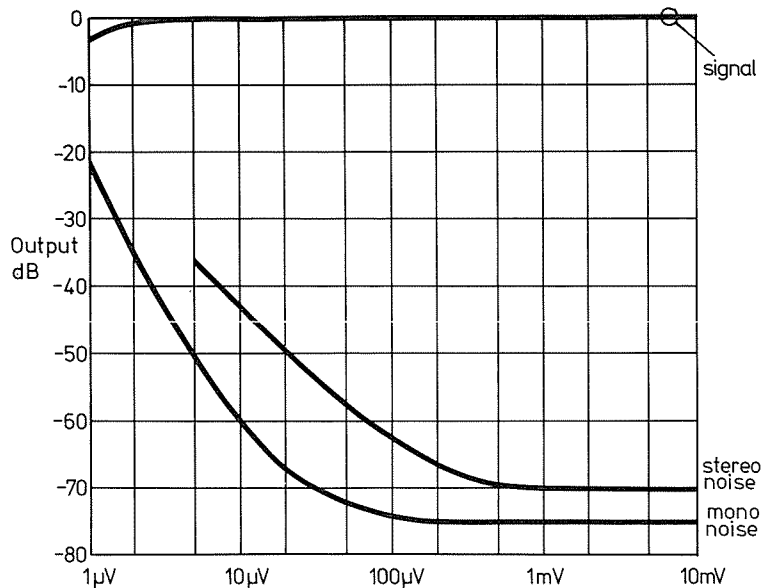
Weight

3.5kg

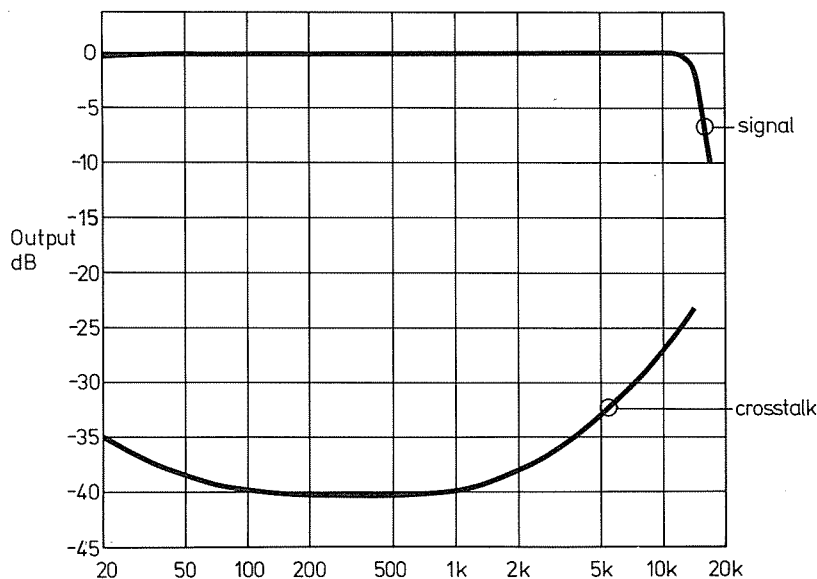
Notes

- 1) 95MHz, ref. 75kHz deviation, 75 ohms input.
- 2) Ref. 75kHz deviation. 30% AM at 400Hz. Aerial signal 10uV - 10mV
- 3) 95MHz, ref. 22.5kHz deviation at 1kHz.

Typical performance graphs



Signal-to-Noise Ratios-Mono and Stereo



Frequency Response and Stereo Separation

Notes

Guarantee for U.K. sales.

The T21 Tuner has been fully tested and a full record of this test made before despatch from the factory. Both the workmanship and the performance of this tuner are (except as set out below) guaranteed against defects for a period of one year from the date of purchase provided that it was originally purchased from an authorised U.K. dealer under a consumer sale agreement. (The words "consumer sale" shall be construed in accordance with Section 15 of the Supply of Goods (Implied Terms) Act 1973.

The Manufacturers can accept no responsibility for defects arising from accident, misuse, wear and tear, neglect, or through unauthorised adjustment and or repair; neither can they accept responsibility for damage or loss occurring during transit to or from the person claiming under this guarantee.

Claims under this guarantee

In normal circumstances, this tuner should be packed in the original packing and returned to the dealer from whom it was purchased. If it is not possible to return the tuner by hand, then it should be sent carriage prepaid by a reputable carrier. Should the original packing not be available, replacement packing can be purchased from the Manufacturers. The tuner should not be sent by post.

If you have any difficulty complying with these requirements, please contact the Manufacturers at the following address:—

Amplification & Recording (Cambridge) Ltd.
Denny End Industrial Centre,
Waterbeach,
Cambridge CB5 9PB

Tel: (0223) 861550

In either case you should state clearly your name, address, the date and place of purchase, together with a brief description of the fault experienced.

Enquiries

The Manufacturers are happy to answer queries you may have regarding the use of this tuner on the condition that this enquiry is by letter and a stamped addressed envelope is provided. You should state clearly the serial number of the tuner, the dealer from whom it was purchased and the date of purchase.

**THIS GUARANTEE IN NO WAY VARIES OR REMOVES A PURCHASER'S
STATUTORY RIGHTS**



Sound Reliability.

**Amplification and Recording (Cambridge) Ltd.
Denny End Industrial Centre,
Waterbeach,
Cambridge CB5 9PB
Tel: (0223) 861550**