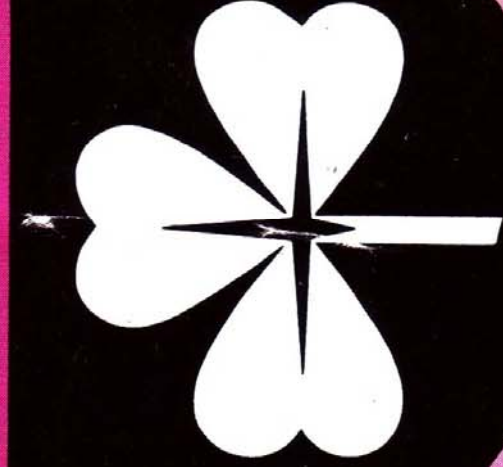


tape recorders

autumn/winter 1969

GRUNDIG



The ABC of Tape Terms



Accessories: Additional equipment to extend the facilities of a tape recorder (see accessory page).

Automatic Recording Level Control: (see Magic Ear).

Automatic Stop: Electrical switch which stops the spools automatically when the end of the tape is reached (this also applies to fast wind and rewind).

Double-Play Tape: (see long-play tape).

Dynamic Range: The relationship between the maximum (undistorted) and minimum volume. It is measured in "Decibels" (abbreviated dB). The smallest change in volume audible to the human ear is 1 dB. The best Grundig machines have a dynamic range of 50 dB or more.

Erase Head: Small electro-magnet which is fed from a high-frequency current to erase a recording. After erasing, the tape—or track—is ready for a new recording. Both actions are usually carried out in one operation.

Four-track Operation: This allows recording along four adjacent tracks, each one having a width of 39 thou. of an inch. This gives twice the operating time of the twin-track machine, but requires a specially selected tape.

Frequency Response: This is the range between the lowest and highest notes reproduced by the recorder. Their vibrations are measured in cycles per second (technical abbreviation Hz).

Long Play Tape: This is approximately 0.4 thou. of an inch thicker than the double-play tape thickness of approximately 1 thou. of an inch. A 7-inch spool holds 1,800 feet of long-play tape or 2,400 feet of double-play tape. Use of double-play tape corresponds to an increase in playing time over long-play tape 33 $\frac{1}{3}$ %.

Magic Ear: This is an automatic recording level control, whereby no manual adjustment in recording level is required. The device, standard on many Grundig models, contains a memory or delay system to retain the many moods of speech and music. The results are perfect recordings even under difficult conditions. Unlike other automatic systems, the Grundig Magic Ear enhances reproduction and does not lead to distortion of sound.

Magic Eye: Shows the recording level. The optimum recording level setting is found just before the two illuminated sectors of the Magic Eye meet.

Moving Coil Meter: Like the magic eye, the moving coil meter shows the recording level. Here a pointer moves across a scale or dial. The point for optimum recordings is clearly marked and the pointer should never exceed this particular level.

Monitoring Via Tape: Apart from the usual monitoring system, a check of the playback quality when making recordings that cannot be repeated is often necessary. The monitoring facility "via tape" of some Grundig recorders with separate recording and playback heads enables the user to check the playback quality while he is actually recording.

Mono: Abbreviation for monophonic, as distinct from a stereophonic system, i.e. only one amplifier channel is in use.

Multi-Disc Safety Clutches: These were developed by Grundig to safeguard the extra-thin tape material which is used for four-track working. The multi-disc clutches limit excessive tape pull in all forms of operation and prevent tape loops.

Playback Head: Small electro-magnet which is influenced by the magnetic impulses of a recorded tape. These are amplified and fed to a loudspeaker which converts them into sound waves. The playback head is often combined with the recording head.

Pressure Tape: This ensures intimate contact between tape and head to produce a playback performance free from "drop-outs". The pressure system, developed by Grundig and consisting of a velvet-like pressure tape, extends the life expectancy of the magnetic heads and safeguards valuable tape materials.

Recording Head: An electro-magnet which impresses magnetic information in the magnetic coating (iron oxide) of the tape when recording. It is usual to combine the recording head with the playback head, though certain Grundig models are fitted with separate recording and playback heads.

Running Time: This depends on the length of tape and the tape speed. A speed of 3 $\frac{3}{4}$ i.p.s. gives twice the running time of the 7 $\frac{1}{2}$ i.p.s. speed, and 1 $\frac{7}{8}$ i.p.s. four times the running time.

Stereophony: This is a twin-channel recording and playback system. All Grundig stereophonic machines are suitable for monophonic (single channel) operation as well.

Superimposition: This allows the addition of a second recording on to a previously recorded tape. When superimposing, the

erase head of the recorder is disconnected and the first recording is slightly reduced in strength. After superimposition both recordings are incorporated on the same track.

Tape Speed: This conforms to International Standards and governs the movement of the tape when recording or playing back. Usual speeds are 7 $\frac{1}{2}$, 3 $\frac{3}{4}$ and 1 $\frac{7}{8}$ inches per second. An increase in tape speed improves playback quality. Top grade Grundig recorders operate at all three speeds.

Temporary Stop: This allows an immediate stop while recording or playing back. After releasing the temporary stop or "pause" control, playback or recording continues immediately.

Tone Control: A variable resistance to emphasise or diminish high or low notes to meet individual requirements.

Wow/Flutter: These are small variations in tape speeds. Bad wow or flutter causes intermittent pitch variations. The superb design of top-grade Grundig recorders using special motors, large fly-wheels, precision drive units and pressure systems, guarantees a performance to studio standards.

A Simple Guide to Good Recording

Every Grundig is issued with easy-to-follow instructions. When recording here is a simple guide to follow:

Speech: Hold the microphone 1 to 2 feet away.

Piano: About 4 to 6 feet to the right of the keyboard and perhaps 2 feet above its level.

Guitars and Other String Instruments: The minimum distance depends on the size and loudness of the instrument. 2 to 4 feet from the neck of a guitar or violin, for example, is usually correct.

Woodwind and Brass Instruments: Position the microphone about 3 feet from brass instruments. To record woodwind instruments, reduce distance slightly.

How To Deal With Echoes: The ideal home recording studio should be fitted with thick rugs, carpets, curtains and other soft furnishings. This is because hard surfaces reflect sound waves so that they enter the

microphone from different angles, causing echoes. Soft surfaces absorb sound, and hence prevent echoes. Should you notice unwanted reflections of sound simply place the microphone in any easy chair, flanked by cushions.

Make Your Own Sound Effects: Here are some examples:

Thunder: An old sheet of tin, perhaps 2 feet by 3 feet, is held up and shaken. You could even try blowing into the microphone from a short distance.

Fire: Crumple a piece of cellophane between your hands close to the microphone.

Shots: A table-top hit sharp with the flat side of a ruler.

Wind Noises: Blow softly into the microphone, or rustle a piece of silk.

Editing Your Tape: The cutting and joining of tape is quite simple if the built-in joining channel of Grundig recorders is used. The tape ends should form a butt joint and are held together with a special joining tape. This editing of tapes allows the removal or adding of a part of a recording. It should only be done if a single track has been in use, as cutting the tape destroys recordings made on other tracks.

Meet the Grundig range of tape recorders

Tape recording is a miracle. A spool of plastic ribbon a quarter of an inch wide can capture whatever sounds you value most—from your child's first words to a symphony. And reproduce them minutes or years later. And with a Grundig, the miracle's made easy. Grundig have a reputation for quality sound, and there are a number of features, unique to Grundig, which ensure perfect performance every time.

There is the Easy-G control on the TK120 Continental, the single lever control on the TK124, TK144 and TK149. The single dial or lever does five jobs. You set it where you want it and let Grundig do the rest. There is the magic eye or moving coil recording level meter which helps you to avoid distortion, and the Magic Ear, on the TK149 and more expensive models. Whatever you are recording this device listens, thinks and balances the sound for you—automatically.

The Grundig range looks as good as it sounds. Example: The TK124 with its smart, uncrushable steel case, the polished teak effect of the TK245 de luxe and the sleek lines of the C200 de luxe. Grundig luxury. Grundig craftsmanship. Think of all the ways You could use a Grundig! You could make a family album of sound. Children are great for spontaneous recording. Don't forget christenings, birthdays and weddings either. The value of these recordings grows as the years go by. The scope is endless. (With the portable C200 de luxe you can record and playback literally anywhere).

A new dimension can be added to holiday slides and movies by taping a commentary with music. For actors learning lines, or students learning a foreign language, a tape-recorder can be invaluable. With a superimposition control, all kinds of trick effects can be created, and on Grundig four-track machines, a musician can even play a duet with himself, by double-tracking. He can rehearse as long as he wants—and wipe out any mistakes.

In this leaflet there is a Grundig to satisfy everyone from the novice to the connoisseur. Reliability and value mean Grundig. For with a Grundig, the whole world of sound is yours—to enjoy.

The Grundig Book

This introduction has told you a little of how a tape recorder works, and what you can do with a Grundig. The Grundig Book tells you much more. In some 280 pages it takes you through the principles of recording and describes in detail the basic parts of a Grundig and the functions of the controls. Recording procedure is fully described and illustrated—from the basic methods of recording from microphone, radio or gramophone to the techniques of "dubbing" and mixing.

The Grundig Book tells you all about editing tape, creating trick effects, building a tape library, and adding extra equipment. Why not get a copy from your Grundig dealer, or write to Grundig direct. The price is 19s. 6d. For technical people "Tape Recorders—Performance Analysis and Service Techniques" explains in detail how tape recorders work, how they are measured, and what their specifications mean. Cloth bound £2 2s. 0d.

THE GRUNDIG RANGE



Grundig tape recorders are only part of the Grundig sound scene. Full information on all Grundig products which include radios, stereograms and audio units, hi-fi equipment and a host of interesting accessories for the enthusiast may be obtained from your local Grundig dealer or direct from Grundig's Publicity Department, Grundig (Great Britain) Limited, London, S E 26. In addition Grundig's Commercial Division offers a wide range of dictating systems to suit the individual needs of any modern office. See and hear the full range of quality sound products at Grundig's London Showroom, 15 Orchard Street, London, W1H 9AE.

GRUNDIG (Great Britain) Ltd, London, S E 26.

A member of the British Industrial Holdings Group

C200 de luxe mobile cassette recording

This is the battery portable you have been waiting for! Using the compact cassette system the C200 de luxe sets a new high standard in portable tape recording. And handsome too, in its sleek square cut black and silver case. The C200, which plays at $1\frac{7}{8}$ i.p.s. is truly portable and will record or playback literally anywhere in any position. Stop, start, pause, fast forward, fast rewind and slick snap out cassette ejection are by the famous Grundig Easy-G single dial control. Among the many useful features are a separate recording level control, volume control and continuously variable tone control. There are three connecting sockets for external power supply, extension loudspeaker, universal input/output and remote control. Conversion to mains operation is simple too with the TN12A mains power pack, an optional extra. The C200 de luxe is supplied complete with cassette giving up to 90 minutes recording, a record/playback lead and a sensitive stick microphone with stop/start switch and microphone stand finished in black and silver to match the machine.

For more details see Specification Table.



TK124 twin track, perfect recording

With the TK124 Grundig again sets a new trend in tape recorder styling. Smart, eye-catching, distinctive, the TK124 is a twin track machine fitted with a moving coil meter to ensure distortion free recording every time. Operation couldn't be simpler with the new Grundig single-lever selector control for stop, start, pause, playback and fast wind. A digital tape position indicator with press button reset helps you locate accurately and instantly any part of your tape and other features include sockets for record/playback, monitor headphones and extension loudspeaker.

The TK124 with its teak finished cabinet, Silver G-line grille and shining silver top deck is a model you will be proud to own. Included in the purchase price is a high performance moving coil microphone with stand, 1200' of tape giving two hours playing time, a spare $5\frac{3}{4}$ " spool and multi-purpose connecting lead.

For more details see Specification Table.





TK120 Continental

**Easy G control,
outstanding value**

The perfect introduction to tape recording. With the TK120 Continental the accent is on simplicity. The beginner is instantly at home with this uncomplicated twin track $3\frac{3}{4}$ i.p.s. machine with its unusually easy to operate Easy-G master control, with illuminated dial for start/stop, pause and wind. There is a simple measuring scale to locate any part of your recording on the tape and input/output sockets are provided for record/playback, monitor headphones and extension speaker.

Robust, reliable and built to last in Britain's largest tape recorder factory, the TK120 Continental has a steel chassis with an attractive teak finish with Silver G-line grille. It comes with a 1200' reel of tape in tape library container giving up to 2 hours playing time, spare spool, multi-purpose connecting lead and a beautifully designed high quality stick microphone with stand.
For more details see Specification Table.



TK144

**four track recording,
top quality performance**

Here is an exciting machine with a host of useful features. With a speed of $3\frac{3}{4}$ i.p.s. it is a four-track machine offering a total playing time of four hours on the special Grundig tape supplied. It uses the new Grundig single lever selector control for stop, start, pause and fast wind. You can even add a commentary to your background music using two of the four tracks, and monitor your recording through headphones. Correct recording level adjustment is by moving coil meter and there is a tape position indicator with instant press button reset. Clean cut lines and teak finished steel cabinet with metallic silver deck places this medium priced tape recorder right in the luxury class.

Supplied with high performance stick microphone, 1200' of long play tape on a $5\frac{3}{4}$ " spool, spare spool and general purpose connecting lead.
For more details see Specification Table.

TK149

**four track,
automatic**

The TK149 stands out as a superb example of Grundig craftsmanship and skill. It is a four track machine incorporating the famous Magic Ear automatic recording level control, although the automatic facility may be switched out to allow manual control if desired. Manual or automatic recording level adjustment and superimposition are selected by a special three position recording button. There are three connecting sockets for record/playback, monitor headphones and switchable extension loudspeaker and a four figure digital position indicator is fitted complete with press button reset. Recordings may be synchronised with the addition of the Monitor Amplifier 229 and earphones 207/S and monitored with the earphone 210/S, all optional extras. The TK149 is completely controlled by the exclusive Grundig single-lever selector switch. The beautiful teak finish case with the Silver G-line grille hides a sturdy steel chassis.
For more details see Specification Table.



TK245 de luxe

**two speed,
four track,
stereo recording**

Here's a really versatile recorder for the enthusiast. The TK245 de luxe gives you 4W output power, has two speeds— $3\frac{3}{4}$ i.p.s. and $7\frac{1}{2}$ i.p.s.—four tracks, and comes with 1,800 feet of tape on a 7" spool to give you a full six hours' playing time.

Recording level adjustment can either be fully automatic, or manual, using illuminated double VU meters. Complete stereo recording facilities are provided and stereo playback is possible through an external amplifier and loudspeaker. You can make synchronised and multiple synchronous recordings, and other features include sockets for radio/gram PU, earphone, four figure press-button tape position indicator and tape inching facilities.

For more details see Specification Table.





TK2200

**two-speed,
transistorised and portable**

Grundig's new TK2200 was designed for perfect recording and playback . . . *anywhere*. Inside the sturdy pressure-diecast case there's a sophisticated electronic assembly to achieve just that. Note the two contra rotating flywheels to stabilise tape speed . . . the brushless DC motor . . . and the fully transistorised circuit. This quality machine operates at $3\frac{3}{4}$ and $1\frac{7}{8}$ i.p.s., and will take 5" spools, giving four hours' playback time. Recordings can be monitored through the built-in loudspeaker or through headphones. Stop/start can be remote controlled from the microphone, and other handy features include a temporary pause button, tape-position indicator, VU recording level meter, and automatic stop. The TK2200 will even convert to mains power supply, using the Grundig TN12A power pack (optional extra).
For more details see Specification Table.



TK247 de luxe

solid state stereo

By 1970, there may be other tape recorders like Grundig's TK247 de luxe. But right now, it's unique. For a start, its fully transistorised solid state construction makes it exceptionally reliable. Then again, this four-track, two-speed machine has facilities for complete stereo playback *and* recording. Its horizons are limitless. You can make multi-synchronous recordings, and monitoring is possible through the built-in loudspeakers or through headphones. And just look at these Grundig refinements: 2 x 4 watt output stages, one for each channel; four loudspeakers; mixer input control; illuminated VU input meters; automatic tape stop. The TK247 de luxe takes up to 7" spools, giving a maximum playing time of eight hours. Stylish cabinet in graphite and silver steel trim.

For more details see Specification Table.

The right is reserved to alter specifications and operational details without prior notice. Tape recorder specifications only apply if correct type of Grundig tape is used.

| | TK120 Continental | TK124 | TK144 | TK149 | TK245 de luxe | TK247 de luxe | C200 de luxe | TK2200 |
|---|-----------------------------|--|--|--|---|------------------------------------|----------------------------|-------------------------------|
| Power Supply | Mains | Mains | Mains | Mains | Mains | Mains | Battery | Battery |
| Tracks | 2 | 2 | 4 | 4 | 4 | 4 | 2 | 2 |
| Tape speeds i.p.s. | 3½ | 3½ | 3½ | 3½ | 3½ 7½ | 3½ 7½ | 1½ | 1½ 3½ |
| Max. spool size in inches | 5½ | 5½ | 5½ | 5½ | 7 | 7 | C90 cassette | 5 |
| Max. playing time for tape supplied | 2 hrs. | 2 hrs. | 4 hrs. | 4 hrs. | 6 hrs. | 6 hrs. | 1 hr. | 3 hrs. |
| Mono-recording-playback | ● | ● | ● | ● | ● | ● | ● | ● |
| Stereo-playback | | | | | with external amplifier | ● | | |
| Stereo-recording | | | | | ● | ● | | |
| Synchronised recording | | | with Monit. Ampl. 229 | with Monit. Ampl. 229 | ● | ● | | |
| Multiple synchronised rec. | | | | | ● | ● | | |
| Superimposition | | | | ● | | | | |
| Temporary stop | ● | ● | ● | ● | ● | ● | ● | ● |
| Input mixing facilities | | | | | | ● | | |
| Remote control | | | | | | | ● | ● |
| Pos. indicator | scale | 4 digit | 4 digit | 4 digit | 4 digit | 4 digit | scale on cassette | 4 digit |
| Autom. stop at end of tape | | | | ● | ● | ● | ● | ● |
| Tape cleaner | ● | | ● | ● | ● | ● | | ● |
| Tape joining channel | ● | ● | ● | ● | ● | ● | | ● |
| Monitoring whilst recording | with earphone | with earphone | with earphone | with earphone | with earphone | ● | ● | ● |
| Loudspeaker | 6 × 4 | 6 × 4 | 6 × 4 | 6 × 4 | 6½ × 3½ and 2½ tweeter | two 6½ × 3½ and two 2½ tweeters | 4½ × 2½ | 5½ × 3½ |
| Microphone input | 2mV/1.5M Ω | 2mV/1.5M Ω | 2mV/1.5M Ω | 2mV/1.5M Ω | 2 × 2mV /1.5M Ω | 2 × 1mV/100k Ω | 0.2mV/7k Ω | 0.25mV/7.5k Ω |
| Radio L.S./Gram P.U. input | Depending on lead | Depending on lead | Depending on lead | Depending on lead | 2 × 90mV/1M Ω | 2 × 30mV/1M Ω | Depending on lead | 80mV/2.2M Ω |
| Radio diode input | | | | | 2 × 4mV/44k Ω | 2 × 1mV/33k Ω | | |
| Radio ext. amplifier output | 500mV/15k Ω | 500mV/15k Ω | 500mV/15k Ω | 500mV/15k Ω | 1V/22k Ω | 2 × 0.8V/22k Ω | 600mV/18k Ω | 500mV/15k Ω |
| Loudspeaker impedance | 5 Ω | 5 Ω | 5 Ω | 5 Ω | 5 Ω | 2 × 4 Ω | 5 Ω | 4 Ω |
| Frequency response: 1½ i.p.s. | | | | | | | 80-10,000 Hz | 40-8,000 Hz |
| 3½ i.p.s. | 40-12,500 Hz | 40-12,500 Hz | 40-12,500 Hz | 40-12,500 Hz | 40-12,500 Hz | 40-12,500 Hz | | 40-15,000 Hz |
| 7½ i.p.s. | | | | | 40-16,000 Hz | 40-16,000 Hz | | |
| SR. signal/noise ratio at: 1½ i.p.s. | | | | | | | ≥ 45 dB | ≥ 46 dB |
| 3½/7½ i.p.s. | ≥ 48 dB | ≥ 48 dB | ≥ 45 dB | ≥ 45 dB | ≥ 46 dB | ≥ 48 dB | | ≥ 47 dB |
| Output power | 2.5 W | 2.5 W | 2.5 W | 2.5 W | 4 W | 2 × 4 W | 800 mW | 2 W |
| Valves and transistors | 3 valves 2 rectifiers | 2 valves 2 rectifiers 1 transistor | 2 valves 2 rectifiers 1 transistor | 4 valves 3 rectifiers 1 transistor | 7 valves 6 rectifiers 2 transistors | 21 transistors 4 diodes | 12 transistors 3 diodes | 18 transistors 9 diodes |
| Wow and flutter | < 0.2% | < 0.2% | < 0.2% | < 0.2% | < 0.15% at 3½ < 0.12% at 7½ | < 0.15% at 3½ < 0.12% at 7½ | < 0.4% | < 0.4% at 1½ < 0.25% at 3½ |
| 60 Hz mains operation | | | | | Conversion kit available | Conversion kit available | with mains power pack | with mains power pack |
| Approximate dimensions | 15½ × 11½ × 7 | 15½ × 11½ × 7 | 15½ × 11½ × 7 | 15½ × 11½ × 7 | 16½ × 13½ × 7½ | 17½ × 13 × 7½ | 9½ × 6 × 2½ | 13½ × 8½ × 4½ |
| Approximate weight in lbs. | 17½ | 17½ | 18½ | 18½ | 30 | 30 | 4½ | 10 |

Grundig accessories

Ask dealer for comprehensive accessories leaflet

Grundig Tape

No matter what Grundig model you own, Grundig tape guarantees the best performance. Specially designed for Grundig recorders, this tape is made to extremely high technical standards. There are four spool sizes—7", 5 $\frac{3}{4}$ ", 5" and 4 $\frac{1}{4}$ "; and tape is available in long-play, double-play or triple-play.



Monitor Amplifier 229

Used with earphones type 207/S to make synchronised recordings on machine TK144, TK149.



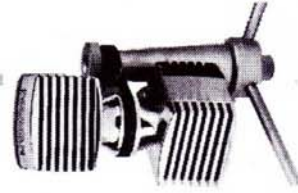
Earphone and Stethoscope

The 207/S works with the 229 Monitor Amplifier on any recorder fitted with the appropriate output socket. The 210/S is used on the TK124, TK144 and TK149 for monitoring purposes whilst recording.



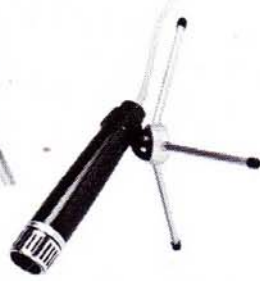
Auto Adaptor Type 386a

This connects Grundig battery portable recorders and most Grundig portable radios to a car battery. Suitable for 12v. negative chassis only.



Stereo Microphone Type GDSM330 and Table Stand

Directional moving coil stereo microphone. Incorporates two separate microphone systems.



Mono Microphone Type GDM317

Directional moving coil microphone for use under difficult acoustic conditions. Reduces the risk of picking up unwanted sound.



Connecting Leads

A full range of Grundig leads can be supplied by your dealer to match the sockets on Grundig tape recorders. A plug-in extension lead, MEC10 (10 yards long) extends the microphone leads on Grundig mains recorders.