

STUDIO

MAY 1970 3s (15p)

SOUND

&  
tape  
recorder

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SURVEY OF PROFESSIONAL  
SOUND RECORDERS

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REMOTE CONTROL FOR  
A REVOX

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QUADRAVERDI

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AROUND THE STUDIOS:  
ADVISION

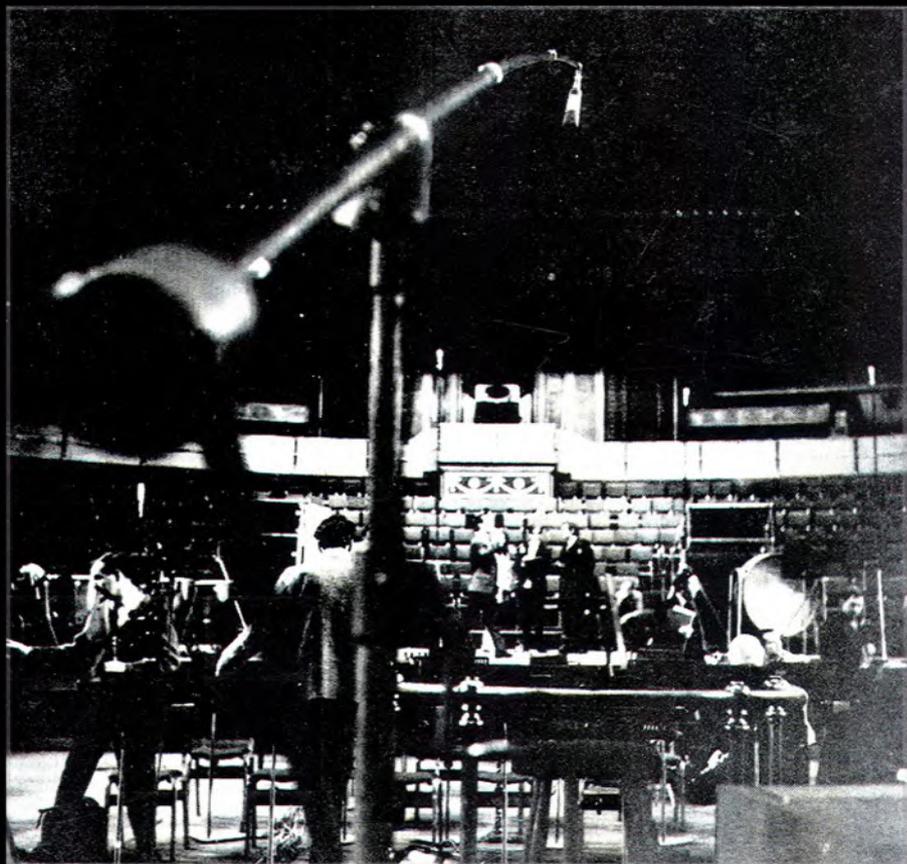
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PHILIPS PRO 12 AND  
FERROGRAPH 7 REVIEWS

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RECORDING STUDIO  
TECHNIQUES: LINING UP

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Most tape recorders have at least one good feature. And they're sold with the emphasis on that one, to take your mind off the things they haven't got, or the things they'd rather not talk about.

Philips PRO 12 is different. It combines in one tape recorder all the features you can usually only find separately in others. And they're all up to the sort of standard that makes them leading selling points.

To start with, there's the frequency response. It betters DIN standard 45511, which gives the requirements for professional studio recorders. Even at its lowest tape speed of  $3\frac{3}{4}$  ips, the PRO 12 is at least the equal of many large studio recorders currently in use at 15 ips. The sound quality of the PRO 12 is so good it could be used for

immediate broadcast purposes.

The rest of the specifications are as you'd expect in a tape recorder of this quality: low harmonic distortion, good signal-to-noise ratio, minimum wow and flutter, excellent speed stability with the classic three-motor design.

In its standard version, the PRO 12 allows for twin-track stereo, twin-track mono and dual-track mono on  $\frac{1}{4}$  inch tape; an alternative version allows for quarter-track stereo or mono.

It also has separate heads and separate amplifiers for both recording and playback at either of its speeds,  $3\frac{3}{4}$  or  $7\frac{1}{2}$  ips, and provides before and after tape (A-B) monitoring either visually or aurally.

A stroboscope for checking tape speeds is built in, and there are

individual correction filters at both speeds plus microphone, diode and line inputs for each channel.

Among the other things you can do with the PRO 12 are transcribe from one track to the other, fade in, fade out, pause, cue, dub, and get echo effects.

In fact the performance specification is so varied yet so exact that every machine is tested individually as it is assembled, and then certified by the engineer whose signature is on the test report that accompanies every PRO 12.

If you'd like the full information on the features of the PRO 12, plus a full set of performance figures, write for our brochure. No matter what you compare it with, you won't find anything like the PRO 12 at anything like the price.

# Compare the range of features. Then compare the price.



**PHILIPS**

Philips Electrical Ltd., Dept. SS1, Century House, Shaftesbury Avenue, London, W.C.2.



# equipment reviews

## PHILIPS PRO 12

**MANUFACTURER'S SPECIFICATION (19 cm/s):** Half-track stereo tape unit. **Tape speed deviation:** 0.8%. **Wow and flutter:** 0.08% (to DIN 45507, measured with EMT 420). **Starting time:** 1 second. **Equalisation:** 70  $\mu$ S (CCIR). **Frequency response:** 60 Hz to 12 kHz within 1.5 dB, 40 Hz to 18 kHz within 2.5 dB, to DIN 45511. **Signal-to-noise ratio:** -56 dB weighted, to DIN 45405. **Total harmonic distortion (+6 dB at full modulation):** 0.5% (record amplifier); 0.5% (replay amplifier). **Crosstalk:** -52 dB (at 1 kHz to 3% third-harmonic distortion, full level on adjacent track, both tracks biased). **Tape speeds:** 19 and 9.5 cm/s. **Line input:** 100 mV at 100 K. **Microphone input:** 1 mV (unbalanced) from 50 ohms to 2 K. **Diode input:** 2 to 40 mV at 20 K. **Optional inputs:** 200  $\mu$ V at 50 ohms balanced (microphone transformer); 400  $\mu$ V at 200 and 500 ohms (taps); 0.775 V or 1.55 V at 600 ohms line input transformer available. **Line and monitor outputs:** 0.775 V to 4 V with 10 K load (600 ohm line transformer available). Internal monitor speaker. **Weight:** 23 kg. **Dimensions:** 520 x 340 x 240 mm. **Price:** £249 10s. (including £49 8s. 7d. purchase tax). **Distributor:** Philips Electrical Ltd., Century House, Shaftesbury Avenue, London WC2.

THE Philips PRO 12 is the newest and smallest addition to the company's long line of highly successful professional audio recorders, thousands of which are in daily use in broadcasting and sound studios all over the world.

Excellent and expensive though it is, I hesitate to place it in any but the domestic bracket. Just one reason: no 38 cm/s speed is provided. The Chancellor of the Exchequer anticipated my feelings on this point by slapping £50 purchase tax on the machine.

The particular sample submitted must have gained entry by the back door unobserved because normally only heavy 'battle-ship' studio types are allowed into my test laboratory. However, it is here now and, bearing in mind that I am biased towards top professional gear, any praise forthcoming for this little fellow will be praise indeed.

Although small, it is quite heavy—23 kg—the reason for this being obvious when the machine is opened up. A massive deep-ribbed alloy



casting supports the mechanics and the continuously running capstan is fitted with two pulleys and a heavy alloy boss, to which is affixed a solid copper disc 165 mm in diameter by 4.5 mm thick. The capstan is driven by a single-speed motor via a polyurethane belt, speed change being effected by a belt shift mechanism. (Why not a two-speed motor?) The copper disc runs between two pairs of adjustable eddy current brakes. A built-in stroboscope and neon lamp enable exact tape speeds to be correctly set.

Two substantial motors drive the tape spools. Rewind is very fast, albeit a little untidy: 110 seconds for 720 metres of tape! Controls on the deck are well laid out, although the push-buttons are rather heavy and the solenoids very noisy. At first I was quite alarmed by this noise and concerned for the safety of my valuable test tapes, but I need not have worried—the thinnest tapes were handled perfectly.

On the right-hand side of the recorder is the electronics panel, hinged at the back. When open this exposes controls for the bias, replay and record response on each channel at both speeds, modulation currents, and so on. There are no less than 16 adjusting screws in all, which will provide a field day for the enthusiast with the necessary test gear or many field days for those without.

A word of warning. Do not attempt to alter the speed change knob with the amplifier panel 'in the air' otherwise a lever will become disengaged and your equalisation goes up the creek. I made this mistake and had to start again. A mechanical modification needed here.

Comprehensive monitoring facilities by push-button switches, including AB check, are provided on the face of the panel which also houses the VU meters, meter switches, input switches and record and replay controls.

Mounted on the back of the recorder is a fine array of nine miniature DIN sockets for various inputs and outputs. I do not like the unbalanced microphone inputs but a balancing transformer is available as an extra.

An internal loudspeaker is fitted to the left-hand side panel. There is a DIN socket for headphone output on the tape deck, also cue and dubbing facilities with tape lifting device and pause button. Another good point, the machine can be operated in horizontal or vertical position, or rack mounted.

In the lid one will find various plastic bags containing mains socket and a collection of well-made right-angle DIN plugs. Also included is the PRO 12 Operation and Service Manual, beautifully printed on art paper: 28 pages crammed with useful information, circuit diagrams, setting up and maintenance procedures. In the Manual are five loose sheets of works test reports of the individual recorder, all filled in by hand and signed by the various

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### TEST REPORT

**Model:** Philips PRO 12  
**Tape:** BASF LH (long play) CCIR  
**Characteristics:** DIN 45511 (Professional standard)

#### FREQUENCY RESPONSE (9.5 cm/s) IN dB

	REPLAY		OVERALL	
	T	B	T	B
40 Hz	-0.5	+0.6	+1	+0.8
63	-0.2	+0.2	+1.3	+1
125	-0.5	+0.6	+1	+0.8
250	-0.5	+0.6	+1	+0.6
500	0	+0.3	+0.5	+0.3
1 kHz	0	0	0	0
2 k	-0.2	0	0	-0.2
4 k	-0.8	-0.8	-0.4	-0.4
6.3 k	-0.8	-0.8	-0.3	-0.3
8 k	-0.8	-0.8	-0.3	-0.3
10 k	-0.8	-0.8	0	-0.8
12.5 k	-0.6	-0.8	+0.2	0
14 k	-1.2	-1.2	-0.5	-0.4
16 k	-0.6	-0.4	-1	-0.8

#### FREQUENCY RESPONSE (19 cm/s) IN dB

	REPLAY		OVERALL	
	T	B	T	B
40 Hz	-0.3	-0.4	-2.5	-3
63	+1.2	+1	-0.6	-0.8
125	+0.7	+0.8	-0.4	-0.5
250	+0.5	+0.5	0	0
500	+0.2	+0.4	0	0
1 kHz	0	0	0	0
2 k	0	-0.2	+0.5	+0.8
4 k	-0.2	-0.4	+1.3	+1.5
6.3 k	+0.3	+0.4	+1.4	+1.5
8 k	+0.2	+0.2	+1.3	+1.7
10 k	+0.2	+0.2	+1.2	+1.8
12.5 k	+0.5	+0.5	+1.4	+1.6
14 k	+0.6	+0.6	+1.4	+1.6
16 k	+0.4	+0.5	+1.3	+1.4
18 k	+0.8	+0.5	+1.5	+1.4

#### WOW AND FLUTTER (18 cm reel)

	START	END (9.5 cm/s)
WOW	.025%	.075%
FLUTTER	.055%	.065%
TOTAL	.06%	.085%

	START	END (19 cm/s)
WOW	.017%	.05%
FLUTTER	.03%	.045%
TOTAL	.035%	.06%

**SIGNAL TO NOISE RATIO** (referred to 32 mM/mm RMS tape flux at 1 kHz): 52.5 dB (9.5 cm/s); 55 dB (19 cm/s)

**HARMONIC DISTORTION** (32 mM/mm RMS tape flux, unweighted): .8% (9.5 cm/s); .65% (19 cm/s)

**CROSSTALK** (ref 32 mM/mm, 1 kHz): 54 dB