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TECHNICAL INFORMATION

Professional Tape Recorder System M15A
magnetophon 15A

AEG



Flexible accessories
and all auxiliary units



The M15A, A-wind configuration shown

The professional tape recorder M15A (short for »magnetophon 15A«) is a compact unit. It incorporates the amplifiers for monaural, stereophonic or two-track configuration, as well as for synchronous operation with pilot-tone or time code.

See separate brochure »magnetophon 15A with SYNC and TIMECODE«

2 tape speed combinations optional for all models 15 and 7.5 ips or 30 and 15 ips.

Special versions are e.g. M15A Preview for pitch/depth control or M15A-Q for quadraphonic recording (1/2"-tape)

The M15A – the master recorder for today and for tomorrow – has been designed for easy and versatile application, taking advantage of the most modern technologies. The amplifiers are equipped with clickfree modulation switches, which are controlled from the tape transport function.

The M15A is designed for top quality master recording and reproduction at radio and tv studios, at motion picture and record industries, at professional studios in general.



M15A in string of consoles



Carrying case (option)
Console 700 (option), right



M15A-Q for quadraphonic recording on 1/2"-tape.
The tape transport is a modification of the M15A-1/4"-tape transport



Console 700 with shelf (option)

M15A in Console 700 with vu-meter bridge
(deliverable with and without monitor loudspeaker), right



Wide Console 800 with Autolocator AL15A



Capstan drive

- Capstan speed stabilized with reference to a quartz oscillator, remains unaffected by mains frequency variations
- Brushless dc motor for minimum wear and disturbance
- Heat minimized with special regard to the capstan
- Loading a tape will start the capstan motor, at tape end the capstan stops. No pressure roller action until capstan is up to nominal speed
- Remote control provided for capstan start/stop
- Mains or externally synchronized operation by pilot tone or time code, with auxiliary units
- Continuously variable speed control, acting through $\pm 50\%$ of nominal speed, with auxiliary unit

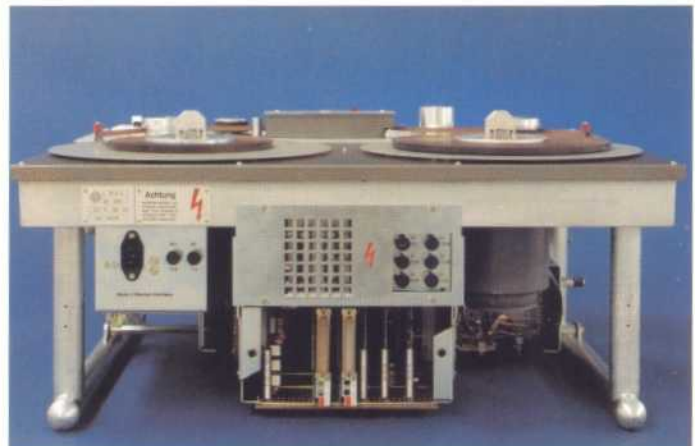
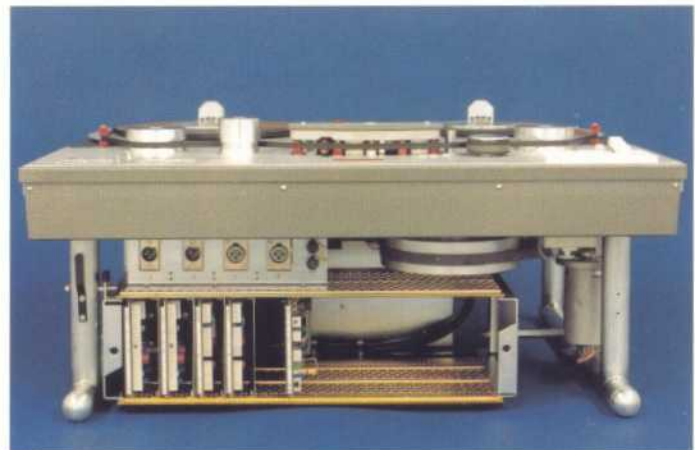
Tape path

- High precision tape guidance to minimize phase fluctuation in stereo mode
- Constant tape tension assured by tension controls right and left. No tension peaks, no tape strain.
- Tight, self-supporting tape packs (pancakes)
- Hubs and spools of all standards accommodated by exchangeable mounts
- Easy-to-handle lock mount for European hubs

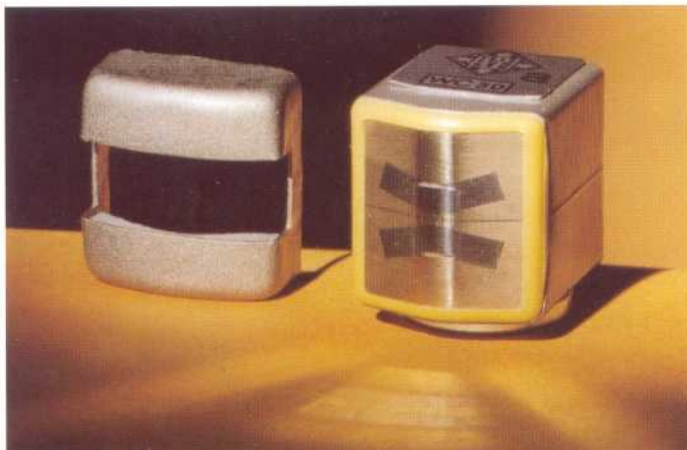
Function controls

- Illuminated push-buttons smoothly acting on solid-state switches
- Push-buttons guarded against inadvertent actuation
- Fully electronic control of all functions
- CMOS logic for high-grade noise immunity
- Reel motor circuits switched by means of triacs
- Fail-safe operation of controls
- Continuously variable spooling speed in both directions, with especially sensitive control at low searching speeds
- Instant stop at tape run-out
- Tape speed indicated by lamps, remotable
- Remote control connections provided on a special plug-in unit (option), adaptable for different remote control systems. Control modes selectable: parallel, remote only, local only.
- Remote control unit for all functions as option
- Automatic unit with tape sensor as option
- The Autolocator (option) will automatically locate any desired tape position. The Autolocator searches the position accurately by the required read-out, without overshooting. Any selected tape portion can be repeated in shuttle mode. Without interfering with the continuous time measurement, the Autolocator is able to display separately the read-out of an individual take duration. The read-outs of up to 9 positions of interest may be stored in the Autolocator memory, retrievable simply by pressing one of the buttons 1 to 9 on the programmable keyboard. All transport remote controls are also incorporated in the Autolocator (see page 7).

Capstan with flywheel and tacho-generator
Amplifier magazine, shown with cover removed
(here shown with XLR-connectors), in the middle
Control logic magazine, shown with cover removed, bottom

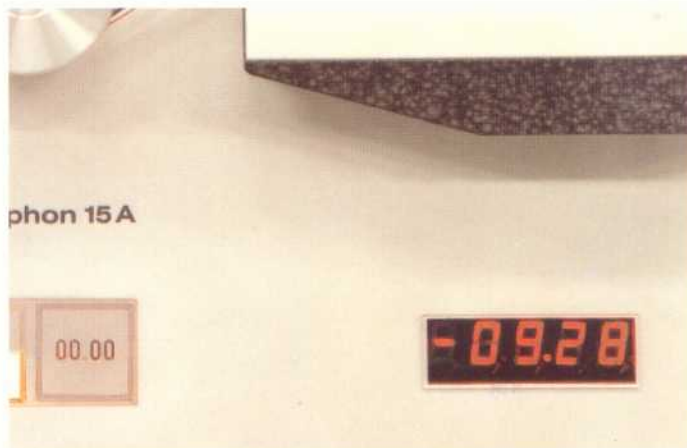
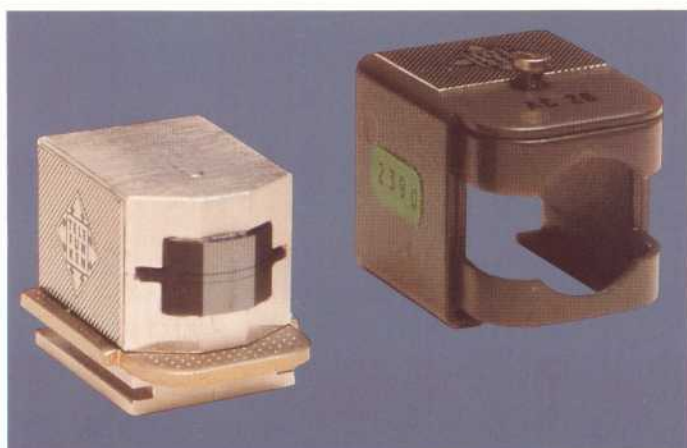


Vacodur head for long life
V-shaped cores for best crosstalk rejection

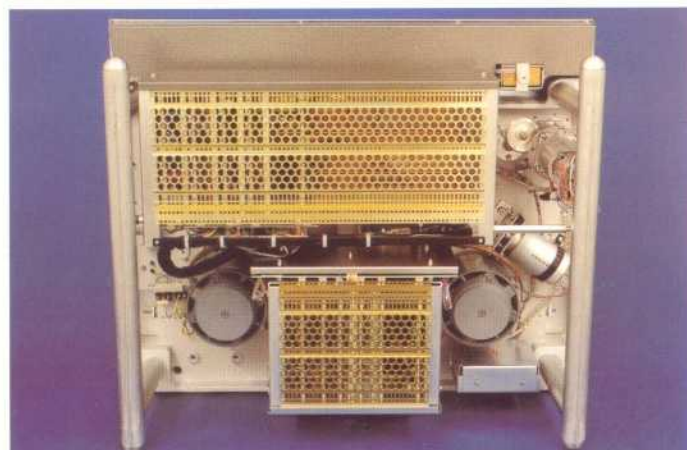


- Optional plug-in units for recording and reproducing pilotone for full-track models
- The amplifier magazine is generally wired for 2 channels. It provides space for up to 4 channels

Electronic tape timer with LED display 10 mm high
(here with negative reading)



Magnetic head of high-density ferrite for long life.
Optimal gap geometry. Improved treble recording



A view from below. The amplifier magazine is hinge-mounted to facilitate maintenance

Head assembly

- Head assemblies are interchangeable without need of mechanical realignment
- Optional Vacodur or high-density ferrite record and playback heads. Long life heads with a precision finish obviating realignment, azimuth adjustable
- High-precision tape guides
- Flutter idler mounted between record and playback heads to eliminate longitudinal tape vibration

Amplifiers

- Printed-circuit plug-in units fitted with ICs
- Electronic switching of equalization for 15 and 7.5 ips, optional for 30 and 15 ips, automatically controlled from speed selected at the tape deck
- Ramp-shaped signal voltages, controlled from transport function, switch the erase, record and replay amplifiers on and off, suitably timed (see diagram page 11). This feature enables clickfree and gapless overdubbing
- Electronic mono-stereo switching (optional) by means of a switch in the head assembly
- Record and playback equalizations adjustable for NAB or CCIR equalization
- Switchable equalization (optional) permitting to select, as required, NAB or CCIR equalization

Minimum maintenance

- High structural stability through rigid die-cast frame
- Highly constant brakes
- Long head life
- Easy access to all sections and components
- Amplifier magazine hinge-mounted
- Running hour counter for due maintenance, indicating capstan motor running time

Vari-speed unit SZ15A, Pilotone synchronization unit NS15A



Remote control unit FS15A, Autolocator AL15A – a most versatile control unit –, Automatic unit AZ15A

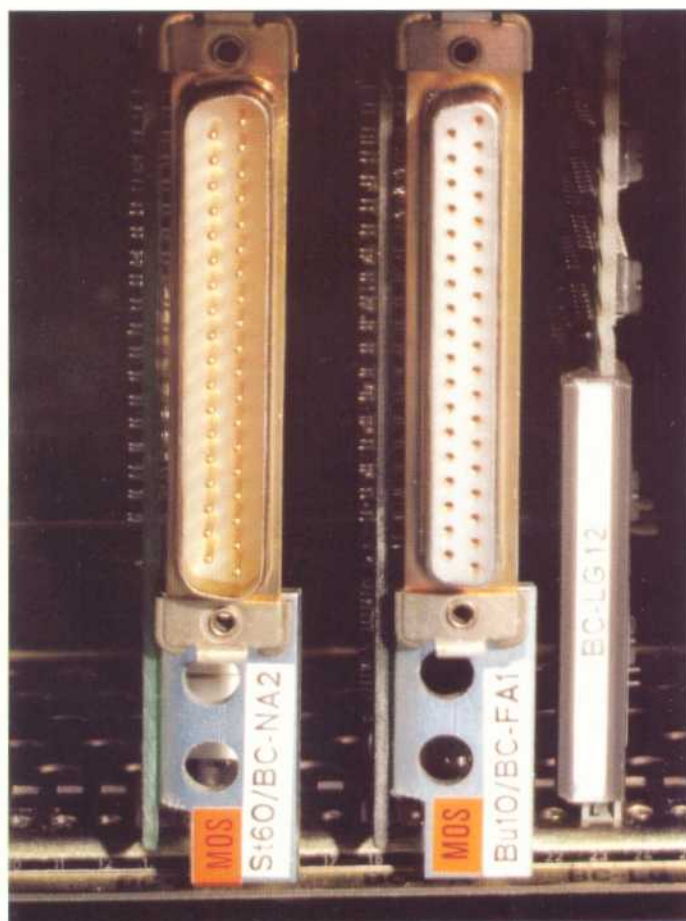
Adapter cards (option) with the connectors for auxiliary units, bottom left: Synchronization adapter, right: Remote control adapter



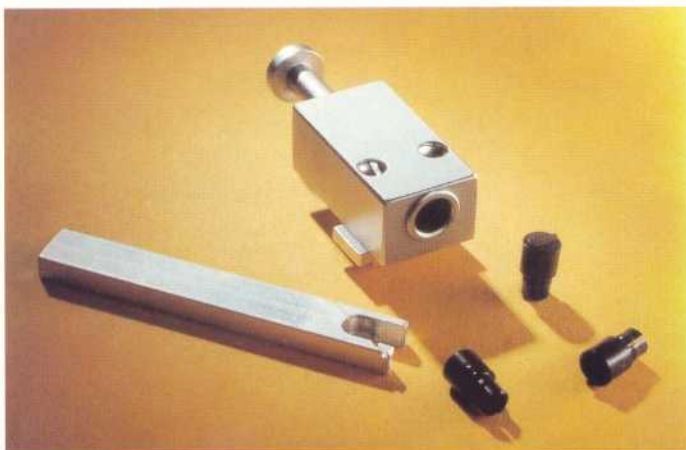
Auxiliary Units/Adapter plug-in units

Accessory	Remote control adapter (with female connector)				Synchronization adapter (with male connector)	
	FA 1	FA 2	FA 3	FA 15*	NA 11	NA 2
FS 15 A	•					
AL 15 A	•					
AZ 15 A		•				
Attenuator start-stop	•	•				
FS 15				•		
E 315				•		
Attenuator start-stop				•		
NS 15 A					•	
SZ 15 A						•

* for remote control compatibility with M15 equipment



Marking unit with easily replaceable stamp inserts, option
 Push-button tape cutter in front of the replay head gap, option
 (in the middle)



Editing

- Monitoring during spooling and stop, with the edit switch on
- Spilling mode enabled by turning the edit switch and pressing a transport control button
- Electronic tape counter with LED read-out in minutes (99) and seconds (59) for all speeds and both directions. A negative sign indicates that the tape position is beyond 00.00 by the amount shown
- Remote read-out incorporated in the Autolocator
- Splicing plate with incorporated tape cutter
- Tape cutter exactly in front of the playback head gap, optional
- Marker with ready-inked, easily replaceable rubber stamp, optional

Easy spilling mode: pressing a control button does it



Specifications

Tape transport

Motor

- 1 brushless dc servo motor with quartz oscillator reference
- 2 special reel motors

Tape speeds

- 15 and 7.5 ips, optional 30 and 15 ips
- Deviation of average speed from nominal speed
max. 0.1 %

Wow and flutter peak weighted (IEC Publ. 386 or DIN 45507), measured with EMT 420 with 1000 m standard tape on European tape hub to DIN 45515

- | | |
|-------------------|-------------------|
| at 30 and 15 ips | at 7.5 ips |
| max. $\pm 0.03\%$ | max. $\pm 0.05\%$ |

Tape slip

- max. 0.1 %

Tape width

- 1/4 inch

Tape length

- 3300 ft (1000 m) standard tape

Tape coating, alternative

- inside (A wind) or outside (B wind)

Hubs and spools applicable

- European type hub to DIN 45515, 100 mm diameter (with turntable for self-supporting tape packs)
- or
- Cine type spool to DIN 45514, 60 mm core diameter
- or
- NAB type spool, 114 mm core diameter (with adapter)

Starting time

- | | |
|---------------------|-----------------------------------|
| until nominal speed | until $\pm 0.1\%$ wow and flutter |
| max. 0.2 sec | max. 1 sec |

Fast wind time

- 130 sec with 3300 ft. (1000 m) tape

Stopping time (out of fast wind with full reel)

- | | |
|------------|------------|
| Stop | Tape end |
| max. 3 sec | max. 2 sec |

Spooling tape tension

- 1 N

Electronic tape timer

- 3-digit display indicating minutes and seconds for all tape speeds,
- in reverse motion beyond zero indicating ascending time with negative sign

Tape timer error

- max. 0.2%

Added timer indication after tape end

- max. 3 sec

Remote control facilities with auxiliary units

with Remote Control Unit FS15A (40 mm x 190 mm)
remote control of all transport modes,
remote only or parallel control,
switch for mono-stereo or NAB-CCIR
with Autolocator AL15A (80 mm x 190 mm)
automatic location of a tape position,
repeated replay of a tape portion,
remote control of all transport modes
with Automatic Unit AZ15A (40 mm x 190 mm)
for automation of broadcasting by means of ready spliced
tapes controlled by transmitted-light tape sensor
with Synchronization Unit NS15A (80 mm x 190 mm)
synchronized tape speed, referred to mains frequency or to
external pilotone frequency (50 or 60 Hz)
with Vari-Speed Unit SZ15A (40 mm x 190 mm)
stepless variation of tape speed within $\pm 50\%$ of nominal
speed, highly accurate repeatability
These auxiliary units are designed as standard control
console cassettes

Amplifiers

Equalization

at 30 ips: 17.5 μ s
to NAB: 30+3180 μ s at 15 and 7.5 ips

or

to CCIR: 35 μ s at 15 ips
70 μ s at 7.5 ips

(optional: equalizations with NAB-CCIR selector)

Input

balanced, floating

Input level

+ 6 dBm (max. + 15 dBm)
or by changing connections
+ 15 dBm (max. + 24 dBm)

Input impedance

min. 5 k Ω between 30 Hz and 16 kHz

Output

balanced, floating

Output level

+ 6 dBm (nominal)
adjustable to + 12 dBm (at 2000 pWb tape flux)
max. output level + 24 dBm
or by changing connections
+ 15 dBm (nominal)

adjustable to + 21 dBm (at 2000 pWb tape flux)
max. output level + 24 dBm

Output impedance (+ 6 dBm and + 15 dBm versions)

max. 40 Ω between 30 Hz and 16 kHz
min. load impedance 150 Ω up to + 18 dBm
200 Ω up to + 24 dBm

Erase/bias frequency

131 kHz with quartz reference

Overall characteristics

These data refer to NAB equalization and to modern tapes,
e.g. 3 M 206 or equivalent

Frequency response

30 ips	60 Hz – 20 kHz:	± 1.5 dB
	80 Hz – 18 kHz:	± 1 dB
15 ips:	30 Hz – 16 kHz:	± 1.5 dB
	60 Hz – 16 kHz:	± 1 dB
7.5 ips:	30 Hz – 15 kHz:	± 1.5 dB
	60 Hz – 10 kHz:	± 1 dB

Signal to noise ratio

"A"-weighted, rms, referring to 400 nWb/m
(i.e. 6dB above operating level)

	30 ips and 15 ips	7.5 ips
full-track	69 dB	69 dB
stereo	65 dB	65 dB
two-track	64 dB	64 dB

Total harmonic distortion

referring to 400 nWb/m (i.e. 6 dB above operating level)

full-track, two-track	1.0%
stereo	1.0%
pilotone model	1.0%

Crosstalk rejection measured with 1 kHz according to
DIN 45521

stereo version:	min. 48 dB (with Vacodur heads)
	min. 38 dB (with ferrite heads)
two-track version:	min. 54 dB (with Vacodur heads)

Erase

min. 80 dB at 1 kHz

Mains

100, 110, 120, 200, 220 or 240 V (+5/-10%), 50 or 60 Hz

Power consumption

max. 190 VA

Ambient temperature

+5°C to + 45°C

Dimensions

Dimensions	Height mm	Width mm	Depth mm	Weight kg
Chassis	308	645	525	53
Carrying case	420	760	615	28
Console 700	920	730	600	42
Console 800	920	815	600	46

Model options

1/4 inch design for tape coated inside (A-wind) or outside (B-wind). Head assemblies and amplifiers have been adjusted together. Thus, by interchanging both head assemblies and amplifiers, the versions are convertible without requiring readjustment

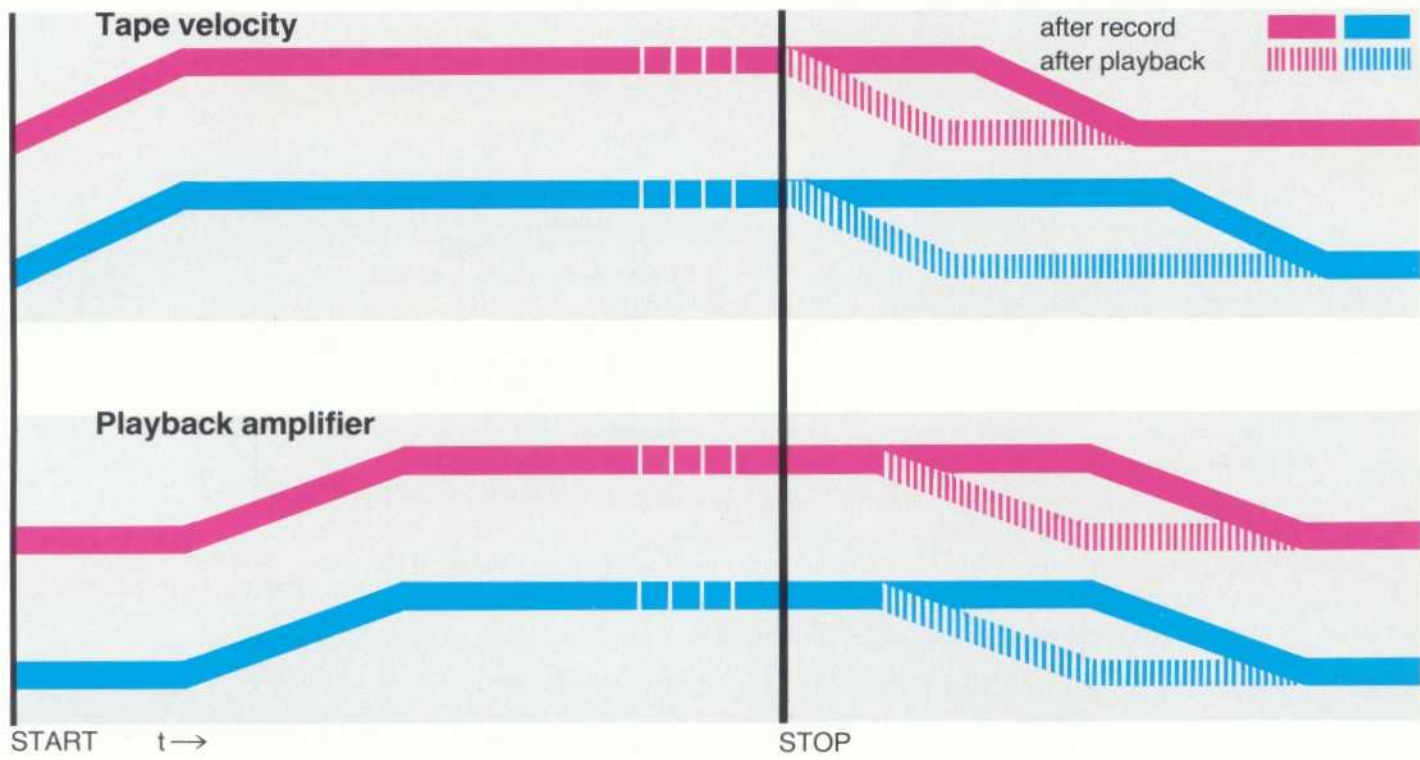
Model Technical features	M15A-1 Mono	M15A-1U Mono, NAB-CCIR	M15A-1U-76 Mono, NAB-CCIR, 30/15 ips	M15A-GPW Mono-Pilotone	M15A-S Stereo, track sep. 0.75 mm	M15A-MS Mono-Stereo, track sep. 0.75 mm	M15A-SU Stereo, track sep. 0.75 mm NAB-CCIR	M15A-SU-76 Stereo, track sep. 0.75 mm NAB-CCIR, 30/15 ips	M15A-SU2 Stereo, track sep. 2 mm, NAB-CCIR A-wind only	M15A-SU2-76 Stereo, track sep. 2 mm, NAB-CCIR 30/15 ips, A-wind only	M15A-2 Two-track, track sep. 2mm
Amplifiers											
Record amplifier	1	1	1	1	2	2	2	2	2	2	2
plug-in unit BC-AV 11											
Rec amp sub-unit BC-ANC1		1					2		2		
Rec amp sub-unit BC-ANC2			1					2		2	
Rec amp sub-unit BC-AMS1						1					
Rec amp sub-unit BC-AMS2						1					
Stabilizer/oscillator	1	1	1	1	1	1	1	1	1	1	1
plug-in unit BC-SL11											
Erase output stage											
module BC-SL14											1
Playback amplifier	1	1	1	1	2	2	2	2	2	2	2
plug-in unit BC-WV 11											
Play amp sub-unit BC-WNC1		1					2		2		
Play amp sub-unit BC-WNC2			1					2		2	
Play amp sub-unit BC-WMS1						1*					
Play amp sub-unit BC-WMK1						*					
Pilotone record amplifier				1							
plug-in unit BC-PA1											
Pilotone playback amplifier				1							
plug-in unit BC-PW1											
Head assembly											
Full-track erase head	•	•	•	•	•	•	•	•	•	•	
Two-track erase head with overlapping erasure											•
Stereo record and playback heads with 2 mm track sep.									•	•	
Push-pull pilot head and audio/pilot rec selector				•							
Track selector											•
NAB-CCIR selector		•	•				•	•	•	•	
Mono/stereo selector						•					
NAB indicator lamp		•	•				•	•	•	•	
Mono indicator lamp						•					
Pilotone level indic. lamp				•							

*) Play amp sub-units in the M15A-MS

Sub-unit plugged	Output signal at Mono
Standard version channel 1: BC-WMS1 channel 2: —	output 1: mono signal output 2: right stereo signal

Optional version: channel 1: BC-WMS1 channel 2: BC-WMK1 or channel 1: BC-WMS1 channel 2: BC-WMS1	output 1: mono signal output 2: no signal output 1: mono signal output 2: mono signal
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Suitably timed control of the amplifiers



Electronic Editing
 Suitably timed control of the amplifiers –
 for clickfree and gapless overdubbing

higher tape speed
 lower tape speed

