F.M. DRIVE EQUIPMENT EP7/7 AND EP7/7A

Introduction

The EP7/7 and EP7/7A each accepts either a pre-emphasised monophonic audio-frequency signal or a stereophonic multiplex signal, and produces a frequency-modulated carrier at a fixed frequency in Band II. The output of the EP7/7 is about 5 watts and is intended to drive a higher-powered transmitter, whereas the power obtainable from the EP7/7A is about 15 watts and this equipment is often used as a low-power transmitter.

Each equipment comprises plug-in units in a PN3/23 panel with the addition of an externally-mounted filter FL2/4A. The simplified block diagram, Fig. 1, shows the constituent units of both equipments; the only differences are in the output stages and power suppliers.

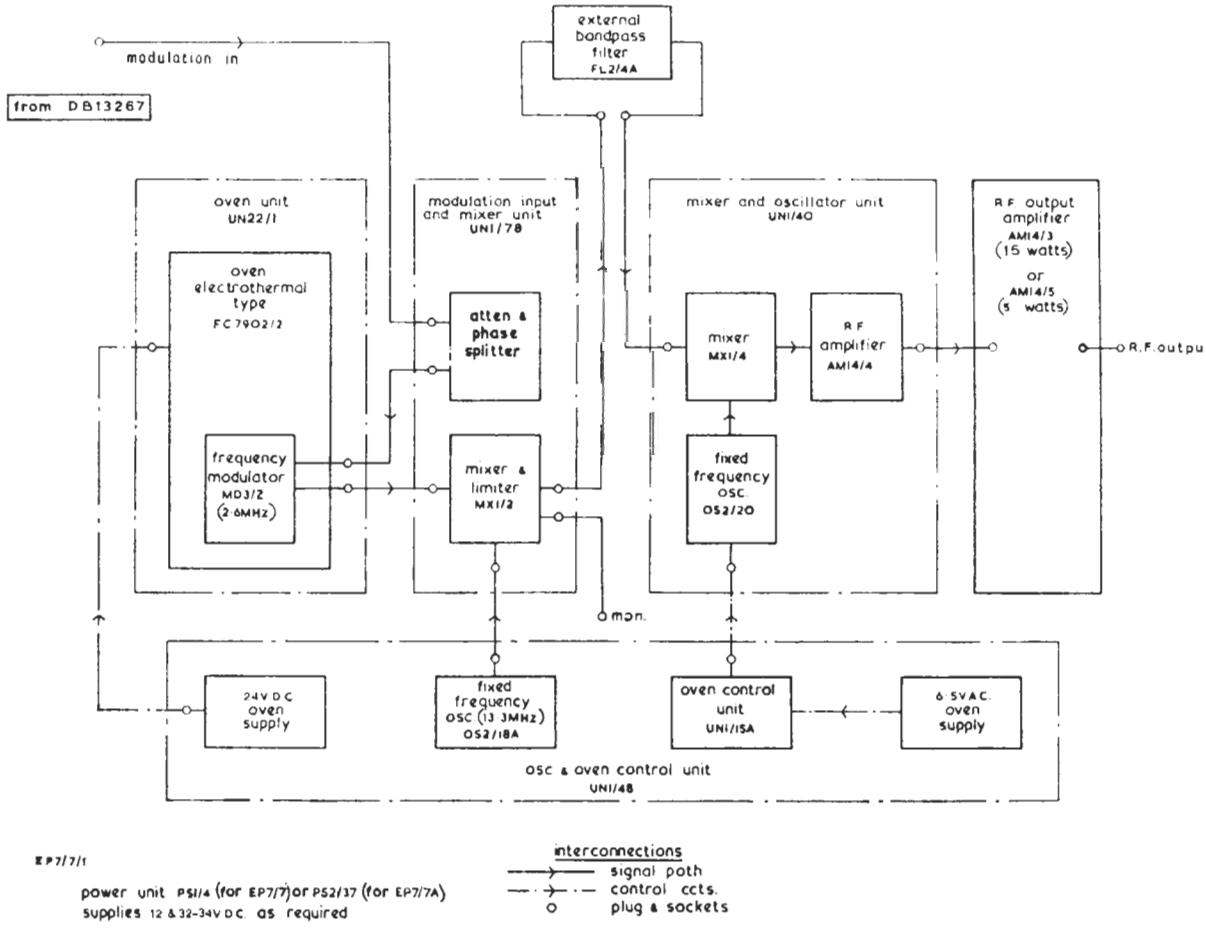

Fig. 1 Block Diagram of the EP7/7 and EP7/7A

General Specification

Modulation Input Impedance	75 ohms or 600 ohms (both unbalanced)
Modulation Frequency Response	±0·5 dB from 30 Hz to 53 kHz
Maximum Sensitivity	±75 kHz deviation from inputs of either 0·7 volts p-p into 75 ohms or 5 dB into 600 ohms.
Output Impedance	50 ohms unbalanced
Output Power	EP7/7: About 5 watts EP7/7A: About 15 watts
Output Frequency Range	87·5 MHz to 100 MHz
Output Frequency Drift	Less than 1 kHz in 3 months
Amplitude Modulation	Less than 2 per cent at any deviation
Power Requirements	200-250 volts a.c. EP7/7: About 80 watts EP7/7A: About 110 watts
Maximum Ambient Temperature	EP7/7: 40 degrees C. EP7/7A: 30 degrees C.
Harmonic Distortion, in derived A.F. channel	Less than 0·5 per cent at ±75 kHz deviation
Stereophonic Crosstalk	When used with the pilot tone system the crosstalk introduced by the drive unit is less than 46 dB from 400 Hz to 5 kHz, and degrades at less than 6 dB per octave to the extremes of the a.f. band.

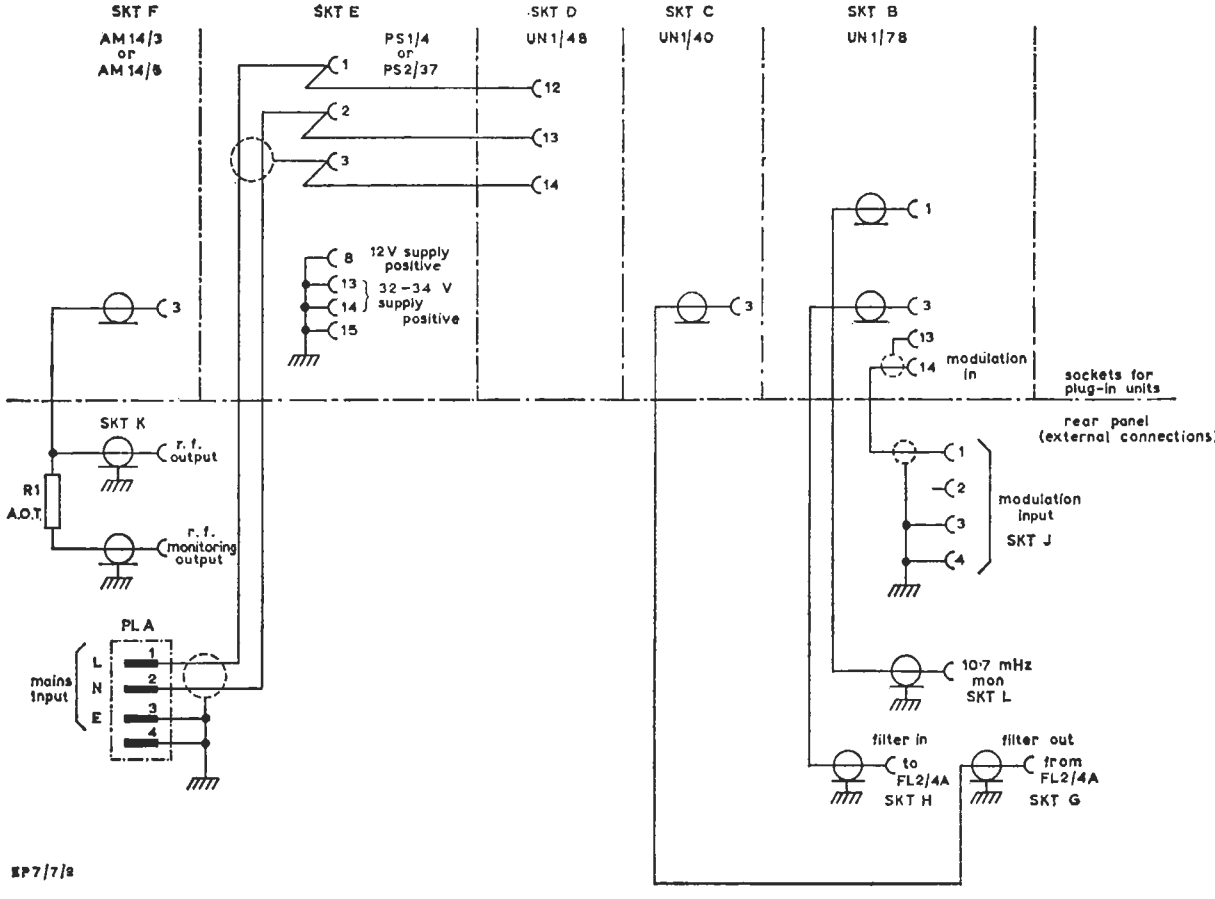

Fig. 2 EP7/7 and EP7/7A: Rear Panel Connections

Table 1. PN3/23 Interconnections

Note: Earth tags on sockets are interconnected in the order A, B, C, D, E and F.

To or from	*Pin*	*Duty*	*From or to*	*Pin*	*Remarks*
SKT.A (UN22/1)	1, 2	strapped. Oven supply to modulator from UN1/48. (−ve)	SKT.D	5	
	3, 4	strapped. As above (+ve)	SKT.D	4	
	5, 6	strapped. −12 V supply from	SKT.B	7	
	7, 8	strapped to pin 15 (earth)			
	9	modulation input from UN1/78	SKT.B	9	
	10	spare			
	11	modulation input from UN1/78	SKT.B	11	
	12	screen of cable to pins 9 and 11	SKT.B	12	
	13	outer coax. 2·6-MHz output to UN1/78	SKT.B	5	
	14	inner coax. 2·6-MHz output to UN1/78	SKT.B	4	
	15	earth	Earth tag		See note.
SKT.B (UN1/78)	1	coax. 10·7-MHz monitoring output to	SKT.L		See Fig. 2.
	2	coax. 13·3-MHz input from UN1/48	SKT.D	1	
	3	coax. r.f. output to FL2/4A	SKT.H		See Fig. 2.
	4	inner coax. 2·6 MHz input from UN22/1	SKT.A	14	
	5	outer coax. 2·6 MHz input from UN22/1	SKT.A	13	
	6	spare			
	7	−12 V supply looped from	SKT.C	7	
		to	SKT.A	5, 6	
	8	spare			
	9	modulation out to UN22/1	SKT.A	9	
	10	spare			
	11	modulation out to UN22/1	SKT.A	11	
	12	screen of cable from pins 9 and 11	SKT.A	12	
	13	outer coax. modulation input from	SKT.J	3, 4	See Fig. 2.
	14	inner coax. modulation input from	SKT.J	1	
	15	spare			
	16	earth	Earth tag		See note.
SKT.C (UN1/40)	1	coax. r.f. output to AM1/43 or AM14/5	SKT.F	1	
	2	spare			
	3	coax. r.f. input from FL2/4A	SKT.G		See Fig. 2.
	4	spare			
	5	oven heater supply from UN1/48	SKT.D	9	
	6	oven heater supply from UN1/48	SKT.D	8	
	7	−12 V supply looped from	SKT.D	7	
		to	SKT.B	7	
	8	spare			
	9	32 to 34 V supply (−ve) from PS	SKT.E	12	
	10	spare			
	11	spare			
	12	spare			
	13	oven control feedback to UN1/48	SKT.D	10	
	14	oven control feedback to UN1/48	SKT.D	11	
	15	−24 V. No external connection			
	16	earth	Earth tag		See note.

Table 1. PN3/23 Interconnections—*continued*

Note: Earth tags on sockets are interconnected in the order A, B, C, D, E and F

To or from	*Pin*	*Duty*	*From or to*	*Pin*	*Remarks*
	1	coax. 13·3-MHz output to UN1/78	SKT.B	2	
	2	spare			
	3	spare			
	4	oven supply to modulator in UN22/1 (+ve)	SKT.A	3, 4	
SKT.D	5	as above (−ve)	SKT.A	1, 2	
	6	spare			
(UN1/48)	7	−12 V supply looped from PS	SKT.E	9	
		to	SKT.C	7	
	8	oven heater supply to UN1/40	SKT.C	6	
	9		SKT.C	5	
	10	oven control feedback from UN1/40	SKT.C	13	
	11		SKT.C	14	
	12	live	SKT.F	1	
	13	neutral 240-volt mains supply looped from	SKT.F	2	See Fig. 2.
	14	earth	SKT.F	3	
	15	spare			
	16	earth	Earth tag		See note.
	1	line 240-volt mains supply from	SKT.A	1	
		looped to	SKT.D	12	
	2	neutral 240-volt mains supply from	SKT.A	2	See Fig. 2.
		looped to	SKT.D	13	
	3	earth from	SKT.A	3, 4	
SKT.E		looped to	SKT.D	14	
	4	spare			
(PS1/4	5	spare			
or	6	spare			
PS2/37)	7	spare			
	8	12-volt output (+ve) earth.			See Fig. 2.
	9	12-volt output (−ve) to	SKT.D	7	
	10	spare			
	11	32 to 34-volt output (−ve)	SKT.F	14	
	12		SKT.C	9	
	13				See Fig. 2.
	14	32 to 34-volt output (+ve) earth			
	15	earth	Earth tag		See note
	1	coax. r.f. input from UN1/40	SKT.C	1	
	2	spare			
	3	coax. r.f. output to	SKT.K		See Fig. 2.
SKT.F	4	spare			
	5	spare			
(AM14/3	6	spare			
or	7	spare			
AM14/5)	8	spare			
	9	spare			
	10	spare			
	11	spare			
	12	spare			
	13	spare			
	14	32 to 34-volt supply (−ve) from PS	SKT.E	11	
	15	spare			
	16	earth	Earth tag		See note

Maintenance Notes

Interconnections between plugs and sockets on the rear of the PN3/23 panel and the plug-in unit-connecting sockets are shown in Fig. 2 and Table 1. The diagram indicates also the strapping to provide a common positive earth for the two outputs of the power supplier. Note that if this is a PS2/37 its current limiter is not required in this application and therefore the RV2 control must be set fully clockwise.

Although each of the plug-in units is nominally interchangeable with others of the same type, adjustments to produce acceptable performance are made on the complete equipment. In particular the setting of the UN1/78 to give adequate overall frequency response and distortion performance is done in conjunction with the MD3/2 in the associated UN22/1. If either of those units has to be removed from the equipment, the other should be taken out also in order that the two can be kept together as a pair. Additionally, the input impedance and fixed attenuation in the UN1/78, as well as the output power of the equipment, are adjusted to requirements at the site of installation.

Centre Frequency Adjustment

Normal day-to-day adjustment of output frequency can be made by resetting the MD3/2 centre frequency with the front control knob on the UN22/1. It may be expedient to use this control also if the output frequency goes out-of-tolerance following the fitting of a new crystal into either the OS2/20 or the OS2/18A.

Linearity Adjustment

This adjustment must be made with the UN1/78 in its working position, *not on a chassis extender.*

Feed the unit with 1-kHz tone and adjust the level to give ±75-kHz deviation. Set the front-panel linearity control for minimum overall harmonic distortion.

Crosstalk Adjustment (for drive units on stereophonic service)

See Instruction P.4 for details of stereophonic measuring techniques.

Note: Linearity adjustment has a second-order effect on crosstalk performance and should be checked before crosstalk adjustment is attempted.

Feed the required multiplex test signal into the UN1/78 and adjust C8 to give minimum crosstalk.

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