RESTRICTED

B.R. 575(1)

AUDIO FREQUENCY EQUIPMENT

A.F.100 SERIES

BROADCAST SYSTEMS

GENERAL INFORMATION

1953

RESTRICTED

Attention is called to the penalties attaching to any infractions of the Official Secrets Acts

B.R. 575(1)

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A.F.100 SERIES

BROADCAST SYSTEMS

GENERAL INFORMATION

Director of Electrical Engineering
ADMIRALTY, S.W. 1

(SO 3079)

AMENDMENTS

Amendment No.	A.F.O. " P " No.	Date of insertion in this copy	Initials

Admiralty, S.W.1

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B.R. 575(1) (Restricted) *Audio Frequency Equipment—A.F.* 100 *Series, Broadcast Systems, General Information*, 1953, having been approved by My Lords Commissioners of the Admiralty, is hereby promulgated for information and guidance.

This pamphlet should be inserted in B.R. 575, guard cover for this series.

Attention is directed to the notice printed below.

By Command of Their Lordships,

D. E. Lang

To Flag Officers and Commanding
Officers of H.M. Ships and Vessels concerned

Suggestions for improvement of the text or illustrations which can be incorporated by way of amendment or in any future revision of this book, will be welcomed and will receive careful consideration; they should be forwarded to the Secretary of the Admiralty through the usual channels.

CONTENTS

ILLUSTRATIONS

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The purpose of this series of reference books is to provide, in as convenient a form as possible, all information likely to be required by the user and maintainer of the A.F. 100 series of equipment for amplification and distribution of speech. The subject matter includes a description of each of the principal items, circuit diagrams of important units which bear an A.P. number, maintenance information, and an explanation of the operation of the gear from the input at the microphone or alarm panel to the output at the loudspeakers.

2. Some of the A.F. systems named in paragraphs 8 and 9 will be found in all ships equipped with A.F. 100 series apparatus; for example a fleet carrier will need almost all, while a destroyer will require only a few. It is for this reason that the descriptive and explanatory printed matter is made up into small books, so as to enable every ship to carry only the books pertinent to the equipment fitted.

3. For the information of the user, instructions as to the procedure for passing messages and on the correct method of speaking into a microphone are given in B.R. 1864.

SAFETY WARNING

4. The voltages employed in the amplifiers and other rack mounted equipment of the A.F. 100 series are sufficiently high to endanger human life. Every reasonable precaution has been taken in the design to safeguard the operating personnel. All the bare terminations of these units are protected by the main cover, the removal of which opens a safety switch in the A.C. power supply, thereby cutting off power from all exposed parts except on the control plug and socket. Power should be completely cut off before changing valves or making any internal adjustments.

5. Certain tests which at times need to be made in connection with repair or maintenance work require that the amplifier or other item should be energised when the protective cover is removed and the safety switch therefore open. This necessitates the temporary closing of the safety switch by other means. Work under these conditions is to be undertaken only by personnel who are fully aware of the dangerous conditions, and who also have taken adequate steps to avoid direct contact with high voltages.

STANDARDISATION OF EQUIPMENT

6. The A.F. (Audio Frequency) 100 series systems are designed to meet the distribution requirements for all forms of amplified speech from loudspeakers. The equipment comprises a range of rack and bulkhead mounted units which have been designed to achieve the maximum of interchangeability and flexibility, and to be suitable for installation in all types of vessels and in shore establishments. The series replaces a mass of un-related, and in most cases, obsolete material.

7. The correlation of the various systems and components simplifies and reduces the supply of spare parts and replacements, and by the reduction of the number of types of apparatus carried maintenance work is facilitated.

SYSTEM NUMBERS

8. The series of A.F. numbers refers to the purpose for which the systems are employed and to the standard audio frequency components forming the particular equipment. The series starts with A.F. 101, the numbers being allocated as follows:—

A.F. NOS.	SYSTEMS
101–114	General or combined broadcasts (Bc.)
115–124	Armament sections
125–130	Flight deck and Hangar sections
131–140	Machinery sections
141–149	Machinery unit intercoms
150–160	S.R.E.

9. Those systems which to date are fully developed are:—

A.F. NOS.	SYSTEM	SHIPS DESIGNED FOR
101	General Bc.	*Eagle*
101A	General Bc.	Carriers
102	General Bc.	Certain destroyers
103	General Bc.	*Vidal*
104	General Bc.	Cruisers
111	Combined Bc.	*Daring* class
112	Combined Bc.	Frigates
115	Armament Bc. (dual)	Where applicable
116	Armament Bc. (single)	Where applicable
125	Flight deck and Hangars	*Eagle*
125A	Flight deck and Hangars	Carriers (double hangars)
126	Flight deck and Hangars	Carriers (single hangar)
131	Machinery Section Bc.	*Eagle*
131A	Machinery Section Bc.	Four unit ships
132	Machinery Section Bc.	Two unit ships
141	Machinery Intercom	Cruisers and above

The S.R.E. A.F. 100 designs are dealt with in a separate series of reference books.

LIST OF MAIN ITEMS

10. The main components of the systems are:—

	A.P. NO.
(*a*) The 2 watt amplifier	32047
(*b*) The 16 watt amplifiers	32020, 32021 & 32023
(*c*) The 50 watt amplifier	12647
(*d*) The 300 watt amplifier	12649

	A.P. NO.
(*e*) The alarm panel . .	12651
(*f*) Relay panels . . .	12597 and 12653
(*g*) The automatic gain control panel	12652
(*h*) Control boxes (adapted to suit particular needs) . . .	12648 and 12650
(*j*) Microphones . . .	Various
(*k*) Loudspeakers . . .	Various
(*l*) Miscellaneous items (switch boxes, etc.)	—

For information as to which, and how many of each, of these components are fitted in any particular ship reference must be made to the ship's records.

SECTIONS AND THEIR INTER-RELATIONSHIP

11. *Figure* 1 shows schematically the inter-relationship existing between the various sections and systems in a typical fleet carrier. The representations of switches in the Figure must be regarded as symbolic, since few only of those shewn represent actual switches. They are intended only to illustrate the inter-connection between the sections or numbered systems.

12. No representation of the S.R.E. is shewn; the only link between it and the systems shewn is an arrangement whereby the former is muted during a general broadcast.

13. Of the machinery unit intercoms fitted (usually five in such a ship) a representation of one only is shewn.

14. The requirements for, and facilities provided by such an installation are:—

(*a*) *General Bc.* (*A.F.* 101)

(i) To amplify and reproduce speech from any one of eight main positions so as to cover the whole ship by loudspeakers, in seven sections, all sections together or separately.

(ii) Each of four of the seven main sections, namely, armament, flight deck, hangar, and machinery to have control over its own section when necessary without interruption by general Bc. speech.

(iii) To call from any one of the eight general control positions to the four sections named in (ii) above when they are required to listen to an urgent general Bc.

(iv) A lamp indication to be given at all the general control positions when any of the four sections are in separate use or, where applicable, locked out.

(v) To be able to give a general alarm or general warning signal from any one of six of the eight general control positions over all the ship, except that the armament section does not receive either when the general Bc. is locked out from it.

(vi) To enable speech from certain selected positions fitted with extension microphones to be amplified and broadcast over the whole ship.

(vii) When any general Bc. is in progress the S.R.E. over the whole ship to be muted.

Note. H.M.S. *Eagle.* Seven only general Bc. control boxes are fitted. A push box for giving the general alarm and warning signals, and a connection for an extension microphone, are fitted on the compass platform where other ships have a control box.

(*b*) *Armament Section Bc.* (*A.F.* 115)

(i) To amplify and reproduce speech from any of the sectional microphone positions to cover the whole section in two sub-sections (forward and after) either separately or together.

(ii) To amplify and reproduce over the section loudspeakers, speech or " alarm " or " warning " signals received from any general Bc. control position.

(iii) To be able to " lock out " the general Bc. from the section, and, when locked out, to receive no general Bc. speech, warning signal or alarm signal except over the monitor loudspeaker in the control position.

(iv) When locked out, i.e., in separate use, lamp indication to be given at all the general Bc. control positions.

(*c*) *Flight deck Section Bc.* (*A.F.* 125)

(i) To amplify and reproduce speech from either the flying control or aircraft control positions over the whole section loudspeakers on the flight deck and in the aircraft handling party ready rooms, also, when required, over the loudspeakers in both hangar control positions or in the hangars.

(ii) To amplify and reproduce speech or " alarm " or " warning " signals received from any one of the general Bc. control positions, over the section loudspeakers.

(iii) To be able to reduce the volume of speech sound from the section loudspeakers under quiet conditions.

(iv) Section control positions to be able to " cut in " on and override general Bc. speech over the section, but not the general " alarm " or "warning " signals.

(v) To enable a distinctive " Alert " warning signal to be given from either of the section control positions over the loudspeakers of the flight deck and in the aircraft handling party ready rooms.

(vi) To enable a distinctive " alarm " signal to be given from either of the section control positions over the loudspeakers of the flight deck, ready rooms and hangar control positions, also, at the option of the hangar section control positions, over the hangar loudspeakers.

(vii) When in separate use a lamp indication to be given at all general Bc. control positions.

(*d*) *Hangar Section Bc.* (*A.F* 125) (two sub-sections; upper and lower).

(i) To amplify and reproduce speech from each of the hangar control positions over the loudspeakers of their respective hangars.

(ii) To amplify and reproduce over the sub-section loudspeakers either:—speech, alarm or warning signals from the general Bc. control positions; or, at the option of the sub-section, speech and the flight deck " alarm " from the flight deck control positions.

(iii) Each hangar sub-section to give an indication in both flight deck section control positions when in separate use, and to provide and share a common indication at all the general Bc. control positions when either is in separate use.

(iv) Each hangar control position to be able to transfer control of its sub-section to the control positions of the flight deck section (for example, when the hangar control positions are not manned).

(*e*) *Machinery Section Bc.* (*A.F.* 131)

(i) To amplify and reproduce speech from any one of three control positions over the loudspeakers of the section, comprising six groups of machinery spaces, namely, " A ", " B ", " X " and " Y " units, a steering gear group, and a miscellaneous group. A section loudspeaker is provided at each control position.

(ii) To amplify and reproduce over the section loudspeakers speech or alarm or warning signals from any general Bc. control position.

(iii) The section control position for use to be selected by a switch at the principal control position.

(iv) To be able to " lock out " the general Bc. speech from the section loudspeakers, but not the general alarm or warning signals from the same source.

(v) When locked out the general Bc. speech to be heard over a monitor loudspeaker at the " lock out " switch position.

(vi) When locked out or in separate use an indication to be given at all general Bc. control positions.

(vii) At each section control position a visible indication to be given, by means of a multiple lamp box, when any machinery unit intercom system is in use.

(viii) To be able to listen, by means of a monitor loudspeaker and selector switch at any control position, to speech in progress over any one of the machinery unit intercoms.

Note. The facilities described in (vii) and (viii) to be independent of the position of the switch mentioned in (iii) above.

(ix) The volume of sound from all the section loudspeakers in any machinery space group to be reduced when the sound volume for the machinery unit intercom of that group is reduced, except that the steering gear and miscellaneous groups are not subject to this reduction.

MACHINERY UNIT INTERCOMS (A.F. 141)

(*Figure* 1)

15. The groups of machinery spaces usually fitted with unit intercoms are " A ", " B ", " X " and " Y " units, and a steering gear group. The requirements for and facilities provided by this system in each of those units are:—

(*a*) In any one machinery unit intercom, to amplify and reproduce speech from the control position to any or all of the related machinery spaces equipped with loudspeakers.

(*b*) Certain selected out-stations equipped with microphones to be able to reply or call up and talk to the control position.

(*c*) To be able to reduce the volume of sound from the intercom loudspeakers and simultaneously that from the loudspeakers of the machinery Bc. system in the same spaces, except that no provision is made for the collective reduction of the volume from the steering unit intercom loudspeakers.

PRINCIPAL COMPONENTS AND THEIR FUNCTIONS

Amplifiers

16. The amplifiers are described fully in separate books of this series. The 2 watt amplifiers are employed for amplified telephone and small loudspeaker intercom systems. The 16 watt amplifiers are mainly employed in loud hailing and public address apparatus, intercoms and small broadcast systems. The 50 watt amplifier is employed in medium and large broadcast and S.R.E. installations, either as power for the main output or, in large Bc. systems, as a driver for the 300 watt amplifiers. The 300 watt amplifier is employed for the main output in large Bc. systems, singly, or two with paralleled inputs. This amplifier must be operated by the output from a separate driver amplifier, usually a 50 watt unit.

Automatic Gain Control

17. In general Bc. systems where bugle calls and sounds from a boatswain's pipe are required to be broadcast an automatic gain control (A.G.C.) unit is employed between the microphone and the amplifier in order to prevent the latter being overloaded by excessive volume of sound. It has a similar effect when the volume of voice input is excessive. The method of gain control is described and explained in a separate book of this series.

Alarm Panel

18. The purpose of this component is to enable distinctive audio signals to be broadcast for special purposes. The signals are produced by thermionic valve action which is described and explained in a separate book

of this series. The signals produced and the purposes for which they are used may be:—

NOTE AND PERIOD	PURPOSE
(*a*) Low tone, on and off for equal periods	General warning.
(*b*) High tone, on and off for equal periods	Flight deck alert.
(*c*) Low tone, long on, short off. 3 : 1 period ratio	General alarm.
(*d*) High tone, long on, short off. 3 : 1 period ratio	Flight deck alarm.

Relay Panels

19. All the switching necessary for bringing microphones, amplifiers, A.G.C., alarms and loudspeakers into action, and for all interconnection between the numbered systems is relay operated. The reasons for the adoption of this method are:—

(*a*) In a system of this complexity any other method would be impracticable.

(*b*) Economy of cable and therefore of weight.

(*c*) The switch contacts of all sensitive switching, such as that of the extremely low voltage currents from microphones, are sited in a well protected and ventilated housing.

(*d*) Reduction of interference, since microphone cables are switched near the amplifier instead of opening the circuit at the microphone end of the cable.

(*e*) Action damage risk is reduced. For example, if the switches in the microphone circuits were situated at the speaking positions the liability of those circuits becoming short-circuited by action damage, thereby rendering all microphones inoperative, would be greatly increased.

(*f*) Convenience of maintenance, in that the relays mounted on their panels are all located in the amplifier compartment and therefore, when required, attention can be given and adjustments made under favourable conditions.

The relays and panels are described in a separate book of this series.

Spares

20. One or more of the following components may be carried as spare in ships so equipped:—

2 watt amplifier.
16 watt amplifier (of the patterns fitted).
50 watt amplifier.
300 watt amplifier.
Alarm panel.
A.G.C. panel.

Space in the racks is allocated where possible for the stowage of the spares supplied, the stowage being arranged so that, as far as is possible, spare components are stowed near where they are most likely to be needed. The allowance of spares of each type and of all other components is governed by the "Establishment of Naval Stores."

Rack Units (*General Term*)

21. The four main items which are accommodated in racks, namely, amplifiers (50 watt and above), alarm panels, A.G.C. panels, and relay panels will, for convenience, be referred to in this series of books by the general term "Rack Units."

RACK UNITS. CONSTRUCTIONAL FEATURES

22. The design of rack units allows for their speedy removal from and replacement in the racks when necessary. The weight of each unit is taken by runners on the unit framework bearing on slide brackets in the rack; a method which makes for easy withdrawal for inspection or removal. Rack units are secured in the working position in the racks by captive securing clamps, secured or released by a screwdriver. Studs on the clamps fitting into slots cut in the edge of the unit panels ensure correct positioning of the clamps when securing the units.

23. Rack units which are of similar heights, and which might, therefore, after a removal be replaced in wrong positions in the racks, are provided with a means of indication or location to prevent incorrect replacement. The means employed may be locating pins or studs fixed in the rack, which fit into corresponding holes or slots in the side of the main panel of the unit.

24. Each rack unit is fitted with a protective sheet metal front cover. Before any rack component can be removed from its rack the front cover must be removed and the cable forms unplugged. The covers are secured by clips of a spring loaded quick release type, known as "Oddie" clips. The heads of the clips are slotted to take the edge of a coin or the blade of a screwdriver. To release a clip it must be turned through 90 degrees from its secured position. When replacing a front cover the slots on the heads of the clips must be brought into line with marks on the front of the cover; the clip can then be pressed home into the locked position. Front covers should always be in position when any rack unit is being transported.

25. The front covers of rack units of similar heights are interchangeable, where, therefore, any doubt can exist as to the identity of a cover, a check should be made before replacement by looking at the circuit diagram inside the cover.

26. A spring operated safety switch is incorporated in the supply circuit of each rack unit except those of relay panels. A metal tongue on the inside of the front cover closes the switch against the action of a spring. The switch is single pole, is closed when the cover is in place and open when it is removed.

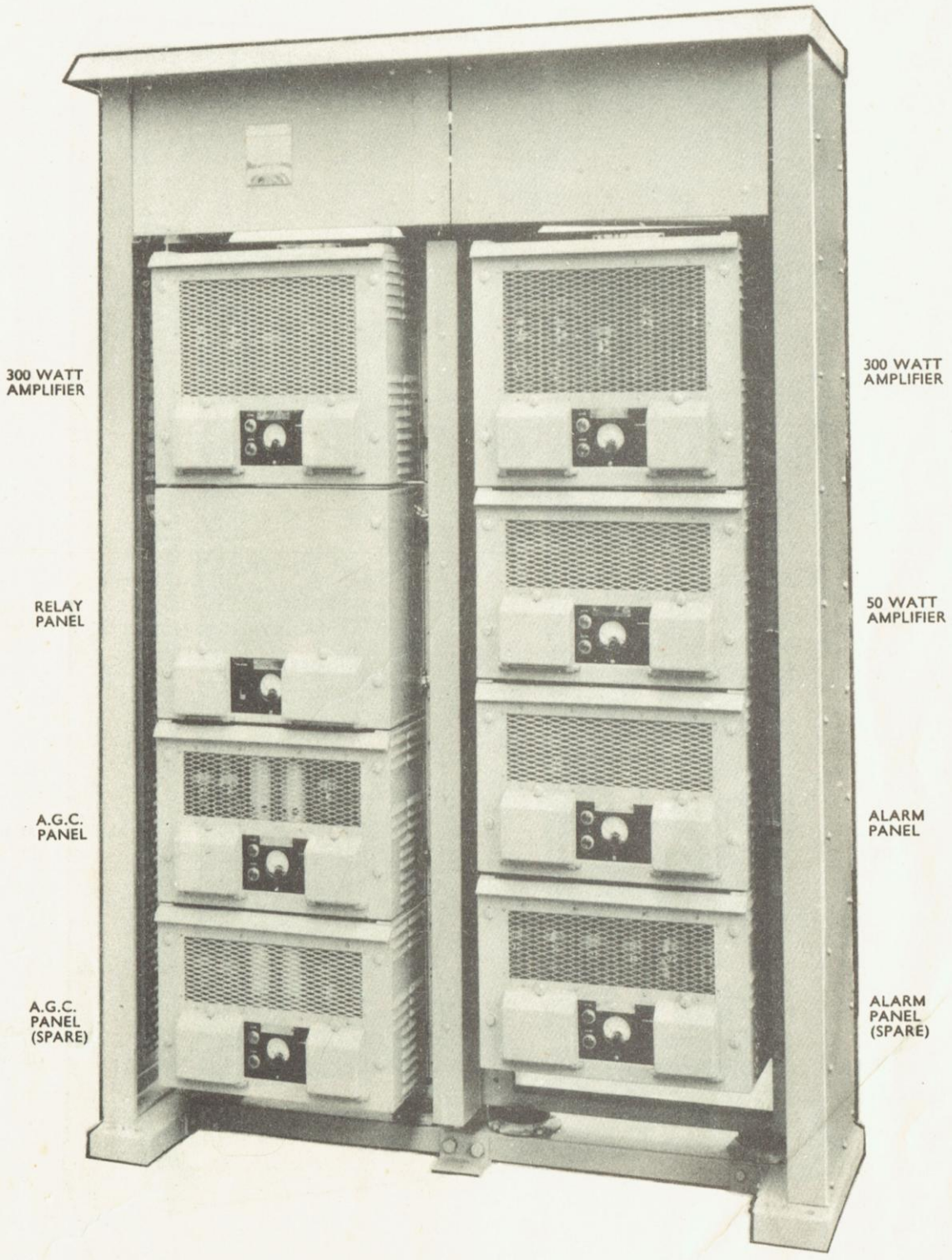

PLATE I. A.F.101. GENERAL Bc. EQUIPMENT
IN A TWO BAY FRAMEWORK

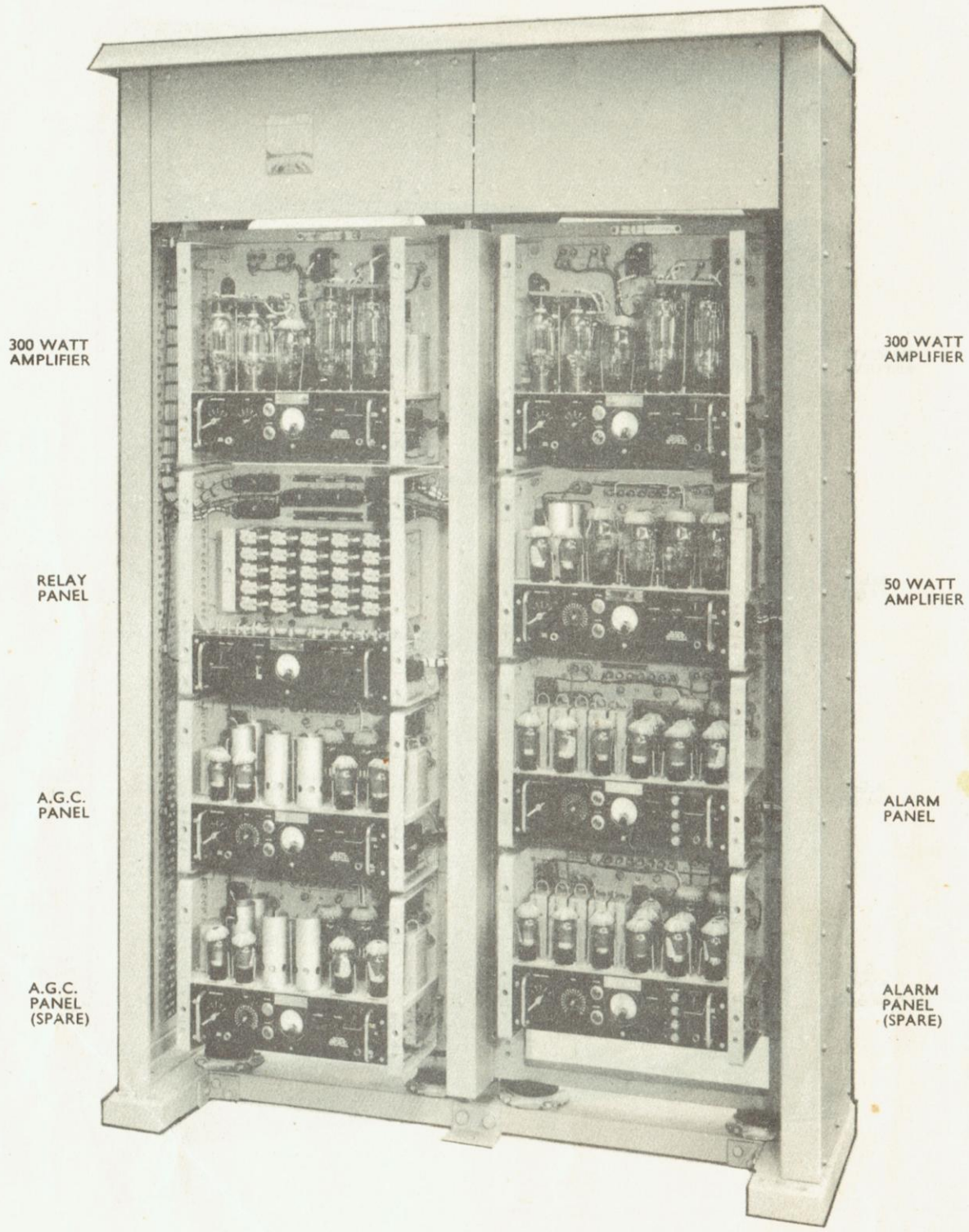

PLATE 2. A.F.101. GENERAL Bc. EQUIPMENT
COVERS OFF

27. A mechanical stop is provided for the safety of the operator and of the unit when removing the latter from a rack. Its purpose is to prevent the unit from running, or inadvertently being drawn, out too far. When the unit reaches the limit of its safe outwards travel, stub pins attached to the runners on either side butt against fixed slide stops. To complete the removal of the unit it must be lifted and tilted upwards to an angle of about 5 degrees; the slide stop then becomes disengaged and the unit free for removal. Some rack units, for example the 300 watt amplifier, weigh up to 122 lbs. Care must be taken therefore to provide adequate lifting effort.

28. The controls, meter switches, H.T. test switch, and fuses of all rack units are protected by hinged covers. These covers have projections on their inner sides which prevent them from being closed unless the controls, switches, etc., have been left in the normal operative positions. The covers are secured closed by Oddie clips which in this case are knurled.

29. Valves in rack units are held securely in their sockets by retainers which prevent vibration from causing the valves to work loose or rise. The retainers are of types to suit valves of different sizes and shapes. For the removal of a valve from its holder the retainer caps or bars can be lifted off the top of the valve without disconnecting the spring anchorages. Valve retainers must always be replaced in position when a valve has been inserted in its holder.

30. Where relays are fitted singly or in small numbers in rack units they are protected by light sheet metal canister type covers. The covers are held in place by retainers resembling valve retainers, except that for this purpose the cap is replaced by glass cord.

Cable Connections

31. In order that all rack units shall be readily removable from the racks all the wiring connections to them are made by multi-pole plugs and sockets, the pattern used being known as the " Jones " type. Each rack unit except the relay panel has three of these, one being for " input ", one for " output ", and the third for " control " circuits. Relay panels each have a " control " plug but have no input or output plugs. The connections are situated at the sides of the chassis and when the front cover is in place its wings fit snugly against the sockets and so prevent them from working loose by ship vibration. The " plug " parts of the connectors are fixed to the unit chassis; the " socket " parts are fitted to the ends of the flexible cable. This arrangement is adopted to reduce the risk of accidental " shorting " of lines on the " free " part when the plug is disconnected.

32. Each plug for any one unit is of a different character or number of blades. One or more dowel or locating pins on each plug fit into corresponding holes in the socket, and prevent the socket from being mated to the wrong plug. Relay panels, in addition to the " control " plug, each have a number of 24-way plugs of the same type for connecting the numerous lines needed. These are secured against vibration by one of two methods; either by spring clip plates on the sides of the sockets, or by a projection on the inside of the front cover fitting closely against them. In the first named method the clips snap into the locked position when the sockets are pressed home, and must be squeezed together for release. Standard connections for all plugs are shown in the appropriate circuit diagrams in the other books of this series.

33. The cabling from the sockets is standard A.P. multicore, or laced cable forms made up from the individual cores or pairs. The cabling is supported by carrier plate and leads away to the terminal panel at the top of the framework or at the bottom of the bulkhead mounting.

MOUNTING OF RACK UNITS

(*Plates* 1 *and* 2)

34. Rack units are designed so that they can be accommodated in racks of standard width. All the items with the exception of the 300 watt amplifier and the large size relay panel, can, alternatively, be housed in a bulkhead mounting.

Frameworks and Mountings

35. The normal method of accommodating the rack units is by racks supported in frameworks. The racks are of standard dimensions and can be mounted in single bay, two bay, or three bay frameworks. This arrangement of mounting provides a method which is flexible, permitting all the varied requirements of the A.F. 100 systems to be met, with economy of space and a maximum of accessibility. Four units of average height can be accommodated in each rack.

Bulkhead Mountings

36. Bulkhead mountings are designed to accommodate the 50 watt, the 16 watt and the 2 watt amplifiers. The 50 watt mounting can alternatively be employed to house other rack units of similar height. This mounting is used where the size of the installation does not necessitate a rack; or, alternatively, to supplement racks.

37. Of the three patterns of the 16 watt amplifier two only can be housed in bulkhead mountings; the third pattern is rack mounted. The 16 watt amplifier bulkhead mounting can accommodate one amplifier, and is smaller and lighter than that for the 50 watt amplifier. The bulkhead mounting for the 2 watt amplifier is made in three sizes, capable of accommodating one, two or five of these amplifiers. The 16 watt and 2 watt amplifier bulkhead mountings are described fully in the handbooks of this series describing the associated amplifiers.

TABLE OF WEIGHTS AND DIMENSIONS

	WEIGHT	HEIGHT		DEPTH FRONT TO BACK	WIDTH OVERALL
		IN TERMS OF "E" †	IN		
	lb.		in. and ft. and in.	in.	in. or ft and in.
Amplifier, 2 watt	16	—	10½	14¾	3½
Amplifier, 16 watt	28	—	9	8½	14½
Amplifier, 50 watt	98	7	12¼	17	19
Amplifier, 300 watt	122	9	15¾	17	19
Alarm Panel	70	7	12¼	17	19
A.G.C. Panel	85	7	12¼	17	19
Relay Panel, large	70*	9	15¾	17	19
Relay Panel, small	60*	7	12¼	17	19
Framework, one bay	200	32	6 ft 2½ in.	21⅜	2 ft 3½ in.
Framework, two bay	380	32	6 ft 2½ in.	21⅜	4 ft 3 in.
Framework, three bay	560	32	6 ft 2½ in.	21⅜	6 ft 2½ in.
Bulkhead mounting (for 16 watt amplifier)	21	—	11¾	11	17¼
Bulkhead mounting (for 50 watt amplifier)	56	7	18	12	24
Bulkhead mounting for 2 watt amplifiers:—					
Single	14½	—	17¼	4¾	17⅞
Dual	19¾	—	17¼	8½	17⅞
5 way	38	—	13	16¾	28

* These figures are maxima.

† See book (2)H of this series.

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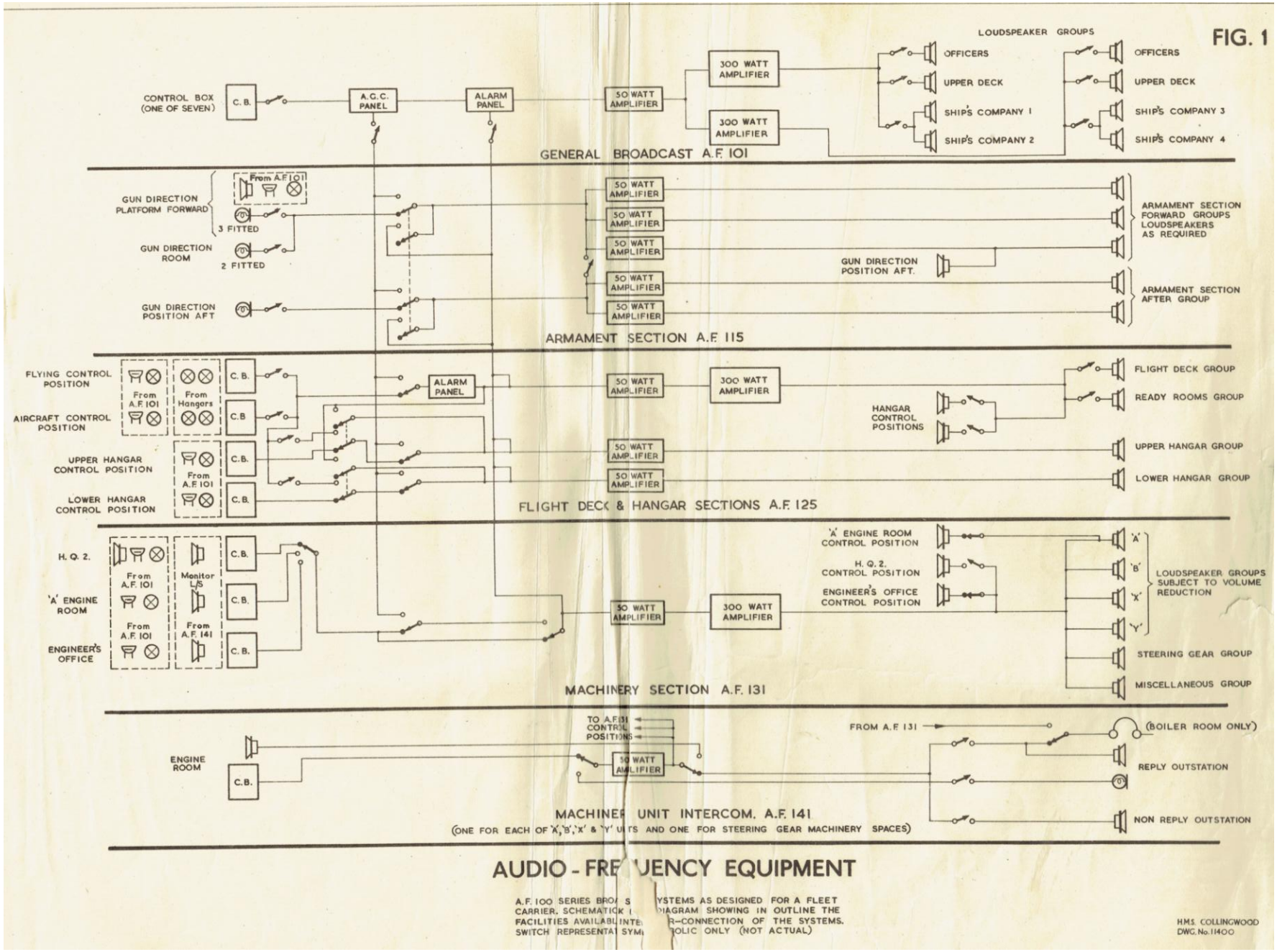
(SO 3079) Wt. 32591—D7179 1000 6/53 H & S Ltd. Gp. 399

FIG. 1

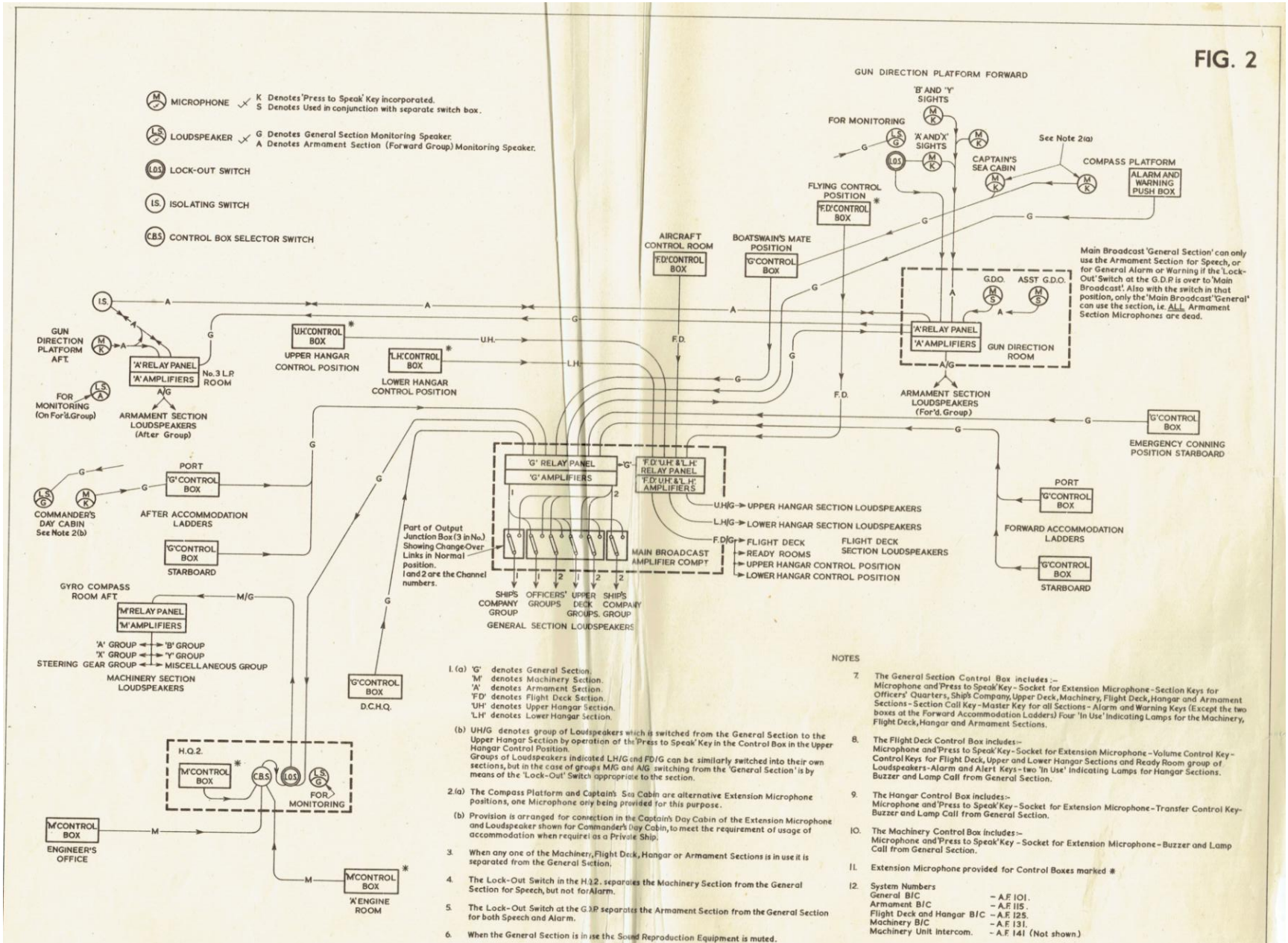


AUDIO-FREQUENCY EQUIPMENT

A.F. 100 SERIES BROADCAST SYSTEMS AS DESIGNED FOR A FLEET CARRIER. SCHEMATICK DIAGRAM SHOWING IN OUTLINE THE FACILITIES AVAILABLE INTER-CONNECTION OF THE SYSTEMS. SWITCH REPRESENTATIONAL SYMBOLIC ONLY (NOT ACTUAL)

H.M.S. COLLINGWOOD
DWG. No. 11400

FIG. 2



1. (a) 'G' denotes General Section.
'M' denotes Machinery Section.
'A' denotes Armament Section.
'FD' denotes Flight Deck Section.
'UH' denotes Upper Hangar Section.
'LH' denotes Lower Hangar Section.

(b) UH/G denotes group of Loudspeakers which is switched from the General Section to the Upper Hangar Section by operation of the 'Press to Speak' Key in the Control Box in the Upper Hangar Control Position.
Groups of Loudspeakers indicated LH/G and FD/G can be similarly switched into their own sections, but in the case of groups M/G and A/G switching from the 'General Section' is by means of the 'Lock-Out' Switch appropriate to the section.

2.(a) The Compass Platform and Captain's Sea Cabin are alternative Extension Microphone positions, one Microphone only being provided for this purpose.

(b) Provision is arranged for connection in the Captain's Day Cabin of the Extension Microphone and Loudspeaker shown for Commander's Day Cabin, to meet the requirement of usage of accommodation when required as a Private Ship.

3. When any one of the Machinery, Flight Deck, Hangar or Armament Sections is in use it is separated from the General Section.

4. The Lock-Out Switch in the H.Q.2. separates the Machinery Section from the General Section for Speech, but not for Alarm.

5. The Lock-Out Switch at the G.D.P. separates the Armament Section from the General Section for both Speech and Alarm.

6. When the General Section is in use the Sound Reproduction Equipment is muted.

NOTES

7. The General Section Control Box includes:–
Microphone and 'Press to Speak' Key – Socket for Extension Microphone – Section Keys for Officers' Quarters, Ship's Company, Upper Deck, Machinery, Flight Deck, Hangar and Armament Sections – Section Call Key – Master Key for all Sections – Alarm and Warning Keys (Except the two boxes at the Forward Accommodation Ladders) Four 'In Use' Indicating Lamps for the Machinery, Flight Deck, Hangar and Armament Sections.

8. The Flight Deck Control Box includes:–
Microphone and 'Press to Speak' Key – Socket for Extension Microphone – Volume Control Key – Control Keys for Flight Deck, Upper and Lower Hangar Sections and Ready Room group of Loudspeakers – Alarm and Alert Keys – two 'In Use' Indicating Lamps for Hangar Sections. Buzzer and Lamp Call from General Section.

9. The Hangar Control Box includes:–
Microphone and 'Press to Speak' Key – Socket for Extension Microphone – Transfer Control Key – Buzzer and Lamp Call from General Section.

10. The Machinery Control Box includes:–
Microphone and 'Press to Speak' Key – Socket for Extension Microphone – Buzzer and Lamp Call from General Section.

11. Extension Microphone provided for Control Boxes marked *

12. System Numbers
General B/C – A.F. 101.
Armament B/C – A.F. 115.
Flight Deck and Hangar B/C – A.F. 125.
Machinery B/C – A.F. 131.
Machinery Unit Intercom. – A.F. 141 (Not shown.)

A.F.100 SERIES BROADCAST SYSTEMS FOR FLEET CARRIERS. KEY DIAGRAM

H.M.S. COLLINGWOOD
DWG. No. 11401
(BASED ON D.E.E. DWG. 16744)

C.B.H. 22641 - Wt. 32591 - Dd. D.8179 - 1000 - 6/53