

HMAS Sydney II Communications Notes

Displacement: Standard 7,105 tons (Hobart), 6,980 (Perth), 6,830 (Sydney). Full load 9,000.

Dimensions (Feet): LOA 555.0, Beam 56.8, Draught 19.6

Machinery: Parsons geared turbines, four Admiralty 3 drum boilers, 4 screws, 72,000 hp

Speed: 32.5 knots. Range: 7,000 miles at 16 knots. Crew 685

Armament: Eight 6" (4x2), eight 4" (4x2) except Sydney four 4" (4x1), four 3 pdr, three 4-barrel 0.5" MGs, eight 21" TT (2x4), one Seagull V amphibian.

Ship	Pendant No.	Builder	Commissioned	Fate
Hobart	I63, D63(1940)	Devonport Dockyard	28/9/1938	Sold 22/2/62
Perth	I29, D29(1940)	Portsmouth Dockyard	29/6/1939	Sunk 1/3/42
Sydney	I48, D48(1940)	Swan Hunter	24/9/1935	Sunk 19/11/41

Wireless Telegraphy.

As completed *Sydney* was fitted with the following wireless telegraphy (W/T) transmitting sets:

MAIN W/T OFFICE

TYPE 48 SET – Main transmitter for cruisers, high powered set and was specific to Sydney. The basic set was a LF/HF set.

Freq ranges LF 60-500 kc/s 20 Kw alternator power, range 1500 miles, CW/ICW.

HF 3000-16500 kc/s 11 Kw alternator 4 valve, CW/ICW, range world wide.

6E Spark section, 70-500 kc/s spark emission, 20v Emergency battery powered, range 50 miles.

HF section capable of high speed morse transmission with high speed automatic morse key/sender.

SECOND W/T OFFICE

TYPE 49 SET – 1934 design with five modifications 49C, 49M, 49MR, 49Y

Transmitter had both LF and HF sections and associated spark section.

LF 100-500 kc/s 8 Kw, CW/ICW, range 600 miles.

LF on low power, 100-1700 kc/s 100 w motor, 1 valve, range 30 miles.

HF 3000-20000 kc/s 8 Kw, 3 valve, CW/ICW, range world wide.

Spark section 70-500 kc/s, 8 Kw motor alternator, spark emission, range 100 miles

AUXILIARY W/T OFFICE

TYPE 43 – Low power valve transmitter originally designed in 1925 and modified in 1929 and again in 1931. The 1931 modification was fitted in only two British battleships.

Freq range 1785-2500 kc/s, motor generator 300w 400v 2 valve, ICW signal

Range 50 miles.

TYPE 45 SETS – designed in 1927 freq range 500-1429 kc/s valve set, CW and ICW range 30 to 70 miles Seagull V aircraft aboard Sydney.

Supermarine Seagull V.

Part of the function of the M/F D/F system on the *Sydney* was in its use with the Seagull V aircraft that *Sydney* was able to catapult for searches and other serials. When the Seagull was in the air and out of sight of the cruiser, by transmitting a signal on M/F the operator in the *Sydney* was able to take a D/F bearing and by passing a reciprocal bearing to the aircraft give it a bearing on which to find the ship again. The ship did not stop at seas while the aircraft was in the air, but remained underway and the aircraft had no way of knowing where she would be when it came time to return other by this means. The D/F



compartment was located in the lower bridge area aft together with a remote control unit Type 532.

The *Seagull V* carried an M/F and H/F set operated by the Wireless Operator/Telegraphist Gunner (TAG – Telegraphist Air Gunner). The M/F section of the set was used for monitoring beacons while the H/F section was used for communications by CW morse. There was no Radio Telephony component to the set.

The *Seagull V*'s aerial was a wire type widely used before 1940. The trailing wire aerial could be anything up to 250 feet long and weighted with a 1 and a half pound lead weight and paid out and retrieved by a hand winch. The Aerial was wound around a drum inside the aircraft and let out through a fairlead in the aircraft's skin through a Paxolin tube. The trailing wire aerial was generally used with M/F or H/F with an aerial selector switch. As aircraft speeds increased this system became obsolete because it had too many drawbacks to its use.

Receiving Sets carried in the *Sydney*.

No1 Tx Room (Main Wireless Office)

Receivers A19 x 2 (15-550 kcs), B12 (150-1500 kcs), B11 (900-2300 kcs)

No2 Tx Room (2nd Wireless Office)

Receiver A19, B11 and B13 standby receiver (15-20000 kcs).

Auxiliary Wireless Office

Receivers A19, B11, and B13 standby receiver.

D/F compartment.

Set covered frequencies 60-2000 kcs, rotating coil system, simultaneous H/F and M/F D/F capability. Type 532 remote system.

Despite wartime proposals to upgrade some of these sets, it is believed that no alterations were effected before the ship's loss.

The main W/T office, which could receive and transmit messages, was located on the centerline of the ship on the lower deck immediately below the mainmast. This office, which incorporated the coding office, was fitted with a Type 48 transmitter set. An adjoining annexe on the port side housed the central receiving room, which contained the battery-powered W/T receiver sets. The aerials were trunked to the top of the after superstructure. Six insulated main transmitting aerials were strung between 24-foot wide W/T yards on the main and fore masts. Five insulated receiving aerials were suspended from the mainmast. Located in the flat immediately forward of the main office were the warning telephone (W/T) panels.

The second W/T office was located on the platform deck directly above the No 1 low-power room and almost immediately below the foremast, which supported its aerials. This office, which could also receive and transmit messages, was fitted with a Type 49 transmitter set and battery-powered receivers.

The auxiliary W/T office was also located on the platform deck. It was fitted with receivers and Type 43 and 45 transmitter sets, the latter being used primarily for gunnery control purposes.

A Type 512 internal buzzer system was provided for communication between the W/T offices. It is understood that all W/T offices received their electrical power from the 220-volt system via feeder cables, this supply being converted locally.

In addition to the W/T offices, a remote control office, located in a compartment on the lower bridge, was provided for the remote controlling of the various W/T installations. For this purpose it was fitted with a Type 532 remote-control outfit.

Sydney's construction plans indicated that the auxiliary office was to house an emergency W/T transmitter and receiver set, although there is some doubt if a set was actually installed in this compartment. Related documents show that the emergency set was Type 6^E, although there is evidence to suggest that this may have been replaced in 1941 with a Type 60^E, which was to be known as the 'standard emergency W/T equipment'. In addition, for protracted emergencies it was recommended that a transportable Type 52T set be fitted, which would serve as an 'after action' set as well as a transportable set. These requirements were reiterated in CAFO 1612 in 1940 and then brought to notice again in CAFO 2045 of 14 November 1940. This latter CAFO provides a rare insight into the realities of W/T communications in the early war years and is reproduced in part.

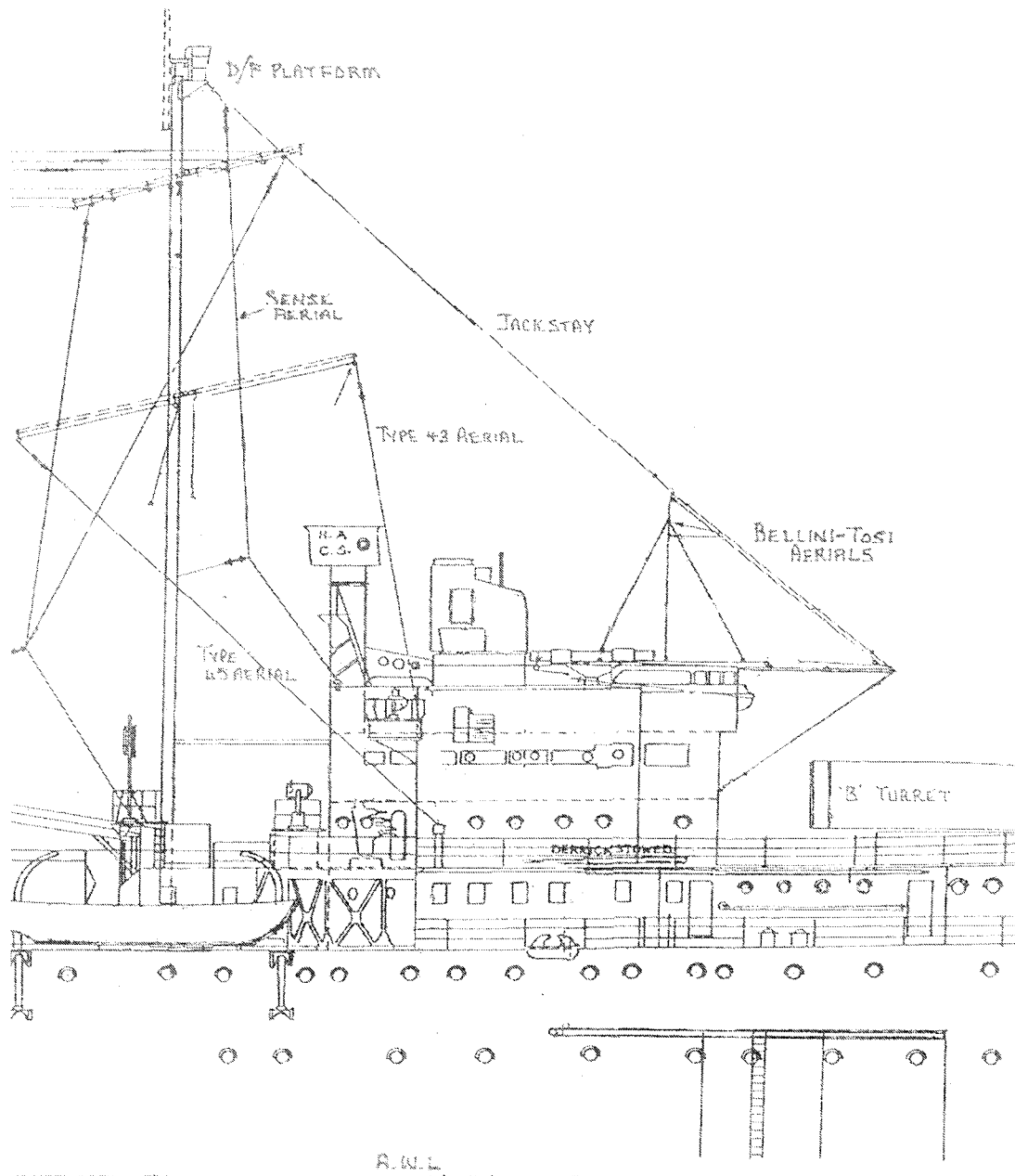
1. Several cases have occurred in which no W/T Enemy Report or distress message was received by other ships or shore authorities from HMA Ships which have been lost in enemy action.
2. In the case of the loss of HM Ships *Glorious*, *Acasta* and *Ardent* only one transmission was received from *HMS Glorious* but nothing was heard from the other two ships. Nothing was heard from HM Ships *Exmouth* and *Daring*.
3. The transmission from *HMS Glorious* was heard by one ship only but was so weak and corrupt that it was not recognized as an 'Enemy Report'.
4. It is considered probably that the main and second W/T transmitters in *HMS Glorious* were destroyed in the early stages of the action and that an attempt was made to transmit a report on a portable W/T set.
5. The most probable causes of W/T failures in action were:
 - (a) Failure of electric power.
 - (b) Serious damage to main W/T equipment.
 - (c) Destruction of aerial system.
6. All HM Ships, other than auxiliary vessels are equipped with some form of emergency W/T equipment working off batteries.
10. If a portable set is carried on board it is to be stowed away from the main W/T office. The portable set is to have tuning adjustment for all ship-to-shore frequencies covered by its wave frequency range.

An alteration and addition list for *Sydney* dated 31 January 1941 indicates that Type 60^E standard emergency W/T equipment was requested for installation in the ship's remote-control office to satisfy subparagraph 10 of CAFO 2045. As this request was approved, it is assumed that the specified equipment was provided and installed before November 1941.

When at sea *Sydney*, like all other warships, maintained wireless silence, the primary task of the W/T organization being that of listening. When there was a requirement to break W/T silence, messages were transmitted in encoded Morse, there being no means by which to send voice messages.

Supplementary to this listening task was direction finding (D/F). The equipment, which enabled bearings to be taken on intercepted W/T transmissions, was installed in a compartment to the rear of the lower bridge.

The W/T system catered for both ship-to-shore and ship-to-ship communications, but visual signaling (V/S) was normally used for short to medium range ship-to-ship signals traffic. For these purposes, signal flags or pennants could be displayed on the signal halyards, or signal projectors could be used to transmit Morse light signals. For light signaling, *Sydney* was equipped with four 10-inch and four 8-inch diameter signal projectors. ("Bitter Victory", Wes Olsen, pages 18-21)



Above: The Bridge area of *HMAS Sydney II* showing the D/F aerial system

[A further note on *HMAS Sydney* D/F system: The *Sydney* had very good D/F capability. A Bellini-Tosi aerial system consisting of two aerials – one fore and aft and the other from port to starboard.

These aerials were situated directly above the bridge and were suspended by a steel cable jackstay, from the boom protruding directly forward of the bridge. The jackstay ran to the top of the foremast. A D/F platform was situated at the top of the foremast. Near the top of the jackstay, perpendicular and parallel to the foremast, was the sense aerial. The sense aerial was a single vertical wire aerial leading to the D/F office at the rear of the bridge superstructure. There, the sense aerial led into the D/F set along with the two bridge aerials and all were connected to a goniometer. By rotating this goniometer the strongest incoming signal could be detected and differentiated by the sense aerial so that a bearing could be obtained on the incoming signal. An incoming signal could be easily decided with an accuracy of two degrees or better. Although it seemed a complicated system, in fact, it was quite simple to operate and a good bearing could be obtained in less than a minute.

Direction finding was used for the detection of wireless signals (both enemy and friendly) and by combining two or more other readings a 'fix' could be obtained and a position plotted. The system could also be used for a ship's own navigation, by D/F-ing two land stations using the reciprocal bearings of those, the ship's position could be obtained with a fair degree of accuracy. It was also well known that enemy ships and submarines often checked their position by monitoring shore radio stations to correct their dead reckoning positions, which were often taken under adverse circumstances.]

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