

## History of Naval Ships Wireless Systems VIII

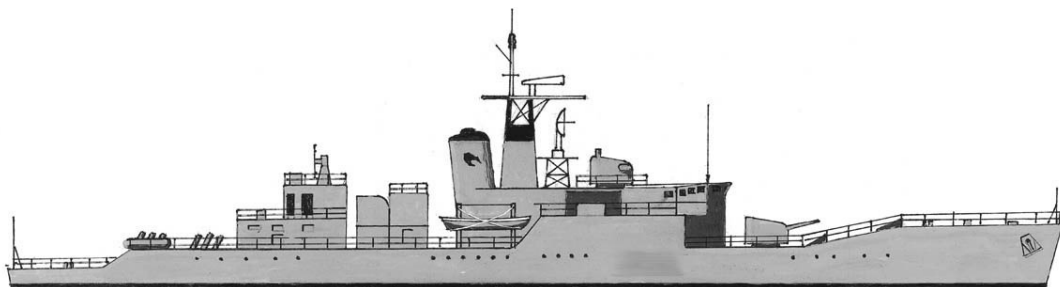
### Post WWII Communications in the Short Term (COMIST)

In the Mid 1950's, it became apparent to the Royal Navy that Communications equipment was completely inefficient in terms of manpower, the use of the RF spectrum (AM transmissions took up too much bandwidth) and would be unable to handle the forthcoming technological advancement - Radio Teletype. In 1958 the RN decided upon major upgrades to its Fleet communications.

1. These upgrades were to encompass all ship-borne communications and were designated the Integrated Communications System (ICS). This would take some time to update the whole fleet, so in the interim, another system was introduced - Communications in the Short Term (COMIST).
2. The Racal RA117 receiver with its Independent Sideband (ISB) capabilities could not operate from an external standard frequency source, but was found to be accurate and stable when supplied from an external frequency synthesiser. This receiver was obtained for COMIST but had to be modified for RATT reception - the AGC required a longer time constant and the receiver's output had to be altered in order to drive the associated RATT equipment.

The modified RA117 with its associated units, was then designated CJK and used alongside a commercially produced transmitter capable of ISB and Single Sideband (SSB) transmissions - Marconi NT204 - designated Type 640.

3. RNZN Type 12 frigates were eventually COMIST fitted with the communications suite consisting of 640s/CJKs, 618s/B40s/B41s. For UHF working they had the 693/692/691 Transmitters with CUH/CUJ Receivers. Previous to COMIST fitting out, radioteletype equipment with AM associated equipment was known as RATT 2 for HF working and A2 Ratt for UHF. These were replaced by RATT Outfit RWA.



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## The Type12/Whitby class

Otago F111 - ZMSI

Taranaki F148 - ZMKF

Blackpool F77 - ZMMG

Displacement: 2144 tons, length 370ft overall, beam 41ft, draught 17ft 4in.  
Armament (original fit): 1 quadruple Seacat missile launcher, 2 x 4.5in guns in twin turret, 2 limbo 3 barrelled depth charge mortars, 8 x 21in torpedo tubes.

Performance: 30 kts

Machinery: two sets geared turbines, two shafts, 30,000 shp.

Complement: 250

The Whitby class Type 12 Frigate was designed in the early 1950s and introduced modern units into the RNZN. The MKII Whitby's were known as the Rothesay Class and were built about 1960. The last three Rothesay Class frigates were changed to the lead ships of the Improved Type 12 (Leander Class) from 1960. The hull design for the RNZNs 3 Whitby and 4 Leander frigates was the same.

Late February 1957, NZ ordered two frigates towards replacing the six Loch Class. Otago being the first from the pre-ordered RN frigate HMS Hastings.

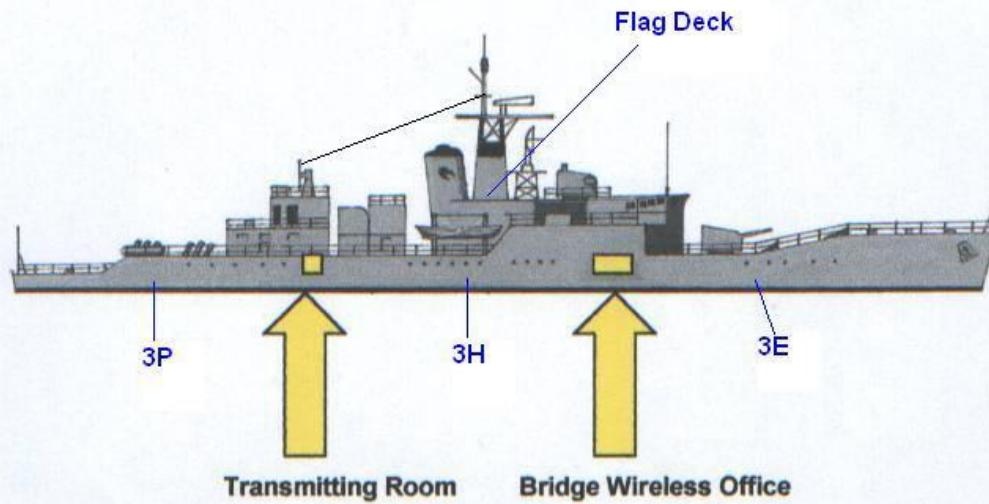
**Otago** commissioned at Southampton, 22 June 1960, worked up at Portland and departed London 17 November 1960 for NZ. Otago and Taranaki were completed as Rothesay Class frigates but to specific NZ modifications and known as the "Otago" Class. Decommissioned November 1983.

**Taranaki** was ordered new and commissioned at the Isle of Wight 28 March 1961 and departed Portsmouth 25 August 1961. Decommissioned June 1982.

**Blackpool** was transferred to the RNZN on loan until Canterbury was built. She commissioned at Chatham 16 June 1966 and departed from Portsmouth 9 October 1966 and immediately went to the Far East and took up station 8 November that year. She finally arrived back in NZ 25 May 1967. She left NZ service June 1971.

All three frigates took part in regular deployments to SouthEast Asia, North America, Hawaii, Australia and the Pacific Islands. The most important being NZ's operational commitment to SE Asia.

## Type 12



Main Signal Office was directly  
Opposite on Port Side

Communicators Mess Decks varied: 3 Deck  
3P (Port/Stbd), 3H (Port) and 3E (Stbd)

Communications Offices: 2 Deck

References to the Type 12 communications fit will be on Otago as she had three changes during her lifetime.

### Otago as built 1961:

8 x B40, 3 x B41, FM12, FH4, UA3, 86M, 4 x 691/CUH, 2 x 692/CUJ, 1 x 693/CUJ, 1 x 601, 1 x 603 with 5ABA FSK, 2 x 618, 1 x 619, 1 x 622, 1 x 610, 6 x 615, 1 x 609. CCS Control System. Original RATT system with Type 12 Creed teleprinters.

**After 1966 refit** - 601 and 603 were replaced with 2 x 640 and 2 x CJK and Freq. Synthesiser - Master Oscillator Unit Outfit FSB. RATT Outfit RWA.

## **After 1974/75 Refit**

### **TR Transmitter Room**

The 640 Transmitters had already replaced the 601 and 603 and the AN/ARC159s replaced the 691/CUH and the 692/CUJ. The AN/ARC 159 was a USN UHF Transceiver designed for the F14 Tomcat. Very tidy sets (about the size of a breadbox) and employed for AM Voice and Radioteletype. Heat in the TR was drastically reduced with the removal of the bigger UHF gear.

2 x 640s (500W PEP)- 1 configured for HF/MF

3 x 643s (100W PEP) these replaced the 618s 1 x CJP

6 x AN/ARC159(V)1 (These were coupled to an Australian designed manual resonator system but the AJEs were found to work perfectly connected to their own individual sets)

Frequency Standard - Outfit FSB

1 x 689 (VHF - International Maritime Mobile)

### **OPS Room**

2 x AN/ARC 159

1 x TR1987 (VHF Air/Ground)

### **BWO**

#### **Receivers**

2 x CJK - replaced the B40s

2 x CJP - replaced the B40s

1 x B41 with Outfit FAZ for SSB (Voice and RATT)

1 x FM12 (FMB) MFDF

4 x TTVF(T) - Radioteletype transmit (RATT Outfit RWA)

1 x TTVF(B) - Radioteletype receive (RATT Outfit RWA)

### **Crypto**

2 x BID 580

2 x BID 660

### **Printers**

6 x Creed 444 teleprinters - replaced the Type 12 teleprinters

Distribution system - KH

Common aerial working EAL(2)

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Emergency Generator was located under the Trophy Cabinet in the Wardroom Flat, Port side next to the MSO. This powered:

1 x 643/CJP in TR  
CJP/B41 in BWO  
1 x AN/ARC 159 in Ops Room  
1 x AN/ARC 159 in TR  
Dummy Load (electric heater) in BWO

### **Aerials**

#### **Foremast**

4 x AJE  
1 x ACH (EW)  
1 x AQA (EW) This was a double ended diamond shaped wire cage type aerial  
1 x FH5 HFDF aerial

#### **Bridge top**

2 x AWN Rx whips

#### **Mainmast**

1 x Bellini Tosi MF/DF loops - sat forrard of the mast below the MF Main Roof  
4 x AJE  
1 x ETB MF Base Tuner which fed the Main Roof

2 x ETC HF Base tuner with 2 x AWF HF Transmit whips  
2 x AWM HF Transmit for 643 and 1 x AWH for 643/CJP

#### **Portable Equipment**

2 x Racal Squadcal SSB HF transceivers  
3 x 634 UHF transceivers  
3 x AN/PRC-77 on loan from NZ Army - 1.5-2 watts FM voice 30-75.9MHz

Worked very well below decks and also used for Damage Control.

1 x AN/GRC-160 this was the vehicle mounting for the PRC77. This was mounted on the end support for the Buntings desk on the bridge. The autotune aerial for this set was mounted on the starboard side of the GDP.

2 x Type 629 liferaft sets

## **EWO equipment**

UA8/9, FH5, with QR and QS receivers.

## **Radar:**

Type 293 early warning radar replaced with type 993 mid 70's - foremast

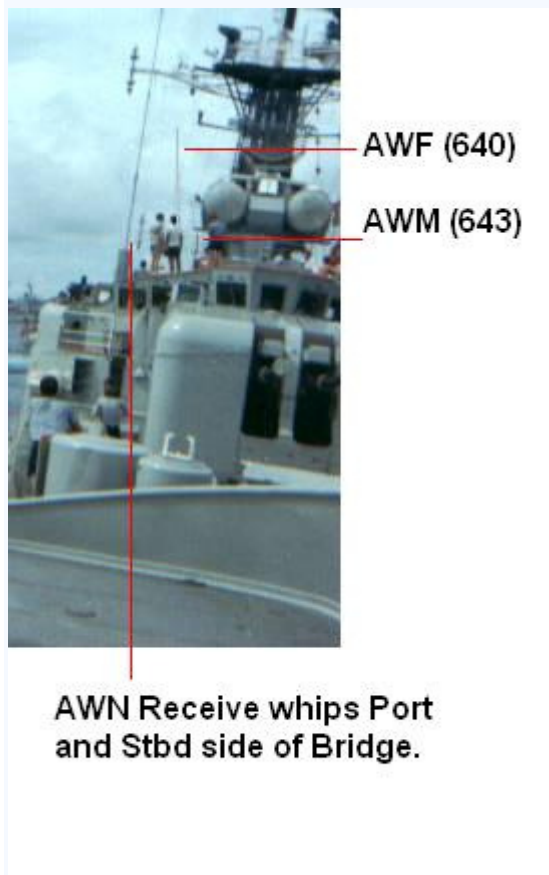
Type 277Q early warning radar - foremast

Type 275 gunnery radar

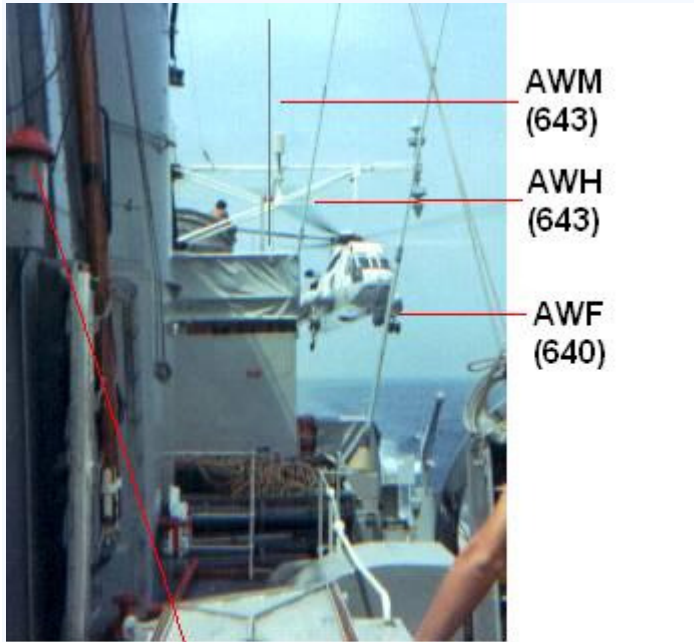
Type 262 seacat radar

IFF Mk10 mainmast

Type 978 navigation radar - foremast



There were two AWM aerials for two of the 643s and one AWH for the other.



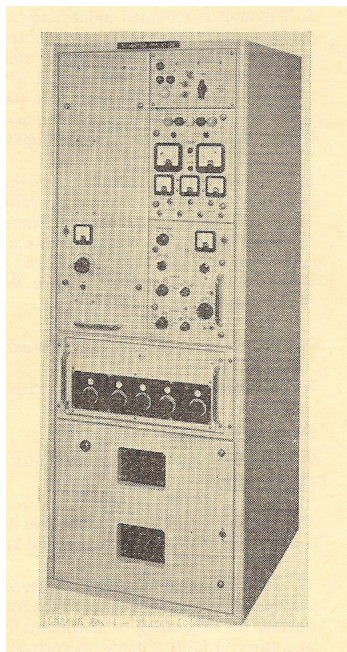
AWM  
(643)  
AWH  
(643)  
AWF  
(640)

MF DF Sense. The SRE  
aerial was on the Stbd  
side.

The 3-wire MF Main Roof was erected between the Foremast and Mainmast and the downleads connected to the ETB on the Mainmast.

The two principal pieces of COMIST equipment were the Type 640 and the CJK.

### Type 640



MF 240 KHz - 3 MHz  
HF 1.3 - 24 MHz  
CW, MCW, DSB, ISB  
500 watts PEP

### **CJK Receiver**



The receiver outfit CJK receiver is built around the RACAL RA17 DSB receiver which when modified for CJK becomes the RACAL 117. The CJK is built in five separate units, the whole being contained in a forced air ventilated cabinet. When fitted alone, it is provided with its own 100 kHz frequency standard. When fitted in conjunction with the Type 640, it is controlled from the external frequency standard FSB.

#### **Units from top to bottom are:**

Power Unit MA150  
Preselector and Protector Unit  
Receiver RA117  
Sideband/Converter/Adapter Unit  
Synthesizer MA150E



Typical Type 12 BWO arrangement. The term Bridge Wireless Office is a bit of a misnomer as the office was situated on 2 Deck well below the Bridge.

During **Otago's** 1974/75 refit the BWO was divided into two areas - Off-line and On-line, by constructing a partition (bulkhead) approximately to the right of the operator on the far left and across to the left of where the second operator on the right is seated. The KH system seen here on the outer bulkhead was shifted to where the second operator on the right is, outside of the new secure area. A metal door was placed in the middle of the partition. All secure cypher equipment, RATT Outfit RWA and teleprinters were placed within the secure area. Broadcast to the left and ship-shore to the right. The two CJKs were sited in the Off-line area approximately where the operator on the far left is seated.

Interestingly, as part of the Harbour Acceptance Trials after the refit, GCSB came up with their specially equipped vehicle to see if the BWO passed the TEMPEST trials. It failed, as the vehicle sitting on the jetty was able to pick up secure RATT transmissions in the clear!

Emergency Aerials:

1 x UHF cross

1 x 35ft wire with insulator for HF