B.R.333(1) VOL.2
SUMMARIES OF DATA
OF RADIO EQUIPMENT
(hips and Shore Stations)
(SUPERSEDES BR333(1) DATED 1950)

BY COMMAND OF THE DEFENCE COUNCIL

OCTOBER 1971

MINISTRY OF DEFENCE
DIRECTOR GENERAL WEAPONS (NAVAL)
(M/W 63718/71)
RESTRICTED
FOREWORD

1. The object of this book dated 1971 is to provide a short descriptive Summary of all non Confidential Radio Equipment in current use in ships, and in some cases jointly in shore stations. Equipments solely used ashore are summarised in BR 333(4).

2. The book is one of a series with titles as follows:-

   BR 333(1) Vols. 1 and 2 Summaries of Data of Radio Equipment (Ships and Shore Stations).
   BR 333(2) Concise Details of Radio Equipment (Airborne) Including Naval Air Radio Equipment.
   AP 116A-0102-1 Obsolete.
   BR 333(4) Summaries of Data of Telecommunication Equipment (Ashore).

3. Unless required in respect of some obsolescent equipment still in use, the superseded publication BR 333(1) dated 1950 should be destroyed in accordance with local arrangements for the disposal of Classified waste.

4. Additionally, reference may be made to Summaries in the following books:-

   (a) BR 222 The User's Guide to Wireless Equipment.
   (b) BR 1982 Warning Radar User Instructions.

5. Summaries of Data for Common Range Electrical Testing Equipment - CRETE - are given in BR 1781.
Transmitter Types
SIF Outfits
Transponders
High Accuracy Receivers
Radar Pulse Synchronisation

Display Outfits
Plotting Systems
True Motion Outfits
Teacher Outfits
Data Distribution
Electronic Marker Outfits

Aerial Outfits

Frequency Standards
Transmitter Types
Drive Units
Power Amplifiers
Responders
Beacons
Satellite Communications
RESTRICTED

SECTION 2

Receivers

SECTION 3

Automatic Telegraphy

SECTION 4

Direction Finding
Auto Alarms
Recording Outfits
Telemetry

SECTION 5

Aerial Outfits
Common Aerial Outfits
Aerial Exchange Outfits
Aerial Tuning Outfits
Control Outfits
Missile Guidance Outfits
SECTION 6

CONTENTS LIST

Transmitter-Receiver 77A

Radar Type 262R, 262(2)R, 262(6)R
Radar Type 277P/Q and 293P/Q
Radar Type 278 (with ANU) (with 986/987/993)
Radar Type 903/904 (with AKK) (To be issued later)
Radar Type 944(1)

Radar Type 944(2)
Radar Type 944(M)(1)
Radar Type 944(M)(2)
Radar Type 954(1)(2)
Radar Type 954(M)(1)(2)

Radar Type 955
Radar Type 955M
Radar Type 957
Radar Type 960
Radar Type 963

Radar Type 965M/P
Radar Type 965Q/R
Radar Type 974(1)(2) (with AKL)
Radar Type 975(1)(2) (with AZF/AZG)
Radar Type 978/M (with ATZ)

Radar Type 982
Radar Type 983
Radar Type 986 (with AKR) (see 278)
Radar Type 987 (with AQI) (see 278)

Radar Type 992Q
Radar Type 993 (with AKD) (see 278) (To be issued later)
Radar Type 1006
Radar Type 1010
Radar Type 1011 (1/2) (To be issued later)

SIF Outfit SND

Receiver Reply (Transponder) Outfit RRA

High Accuracy Receiver Outfit CEQ(1)(2)

Radar Pulse Synchronising Outfit RSD2
Radar Pulse Synchronising Outfit RSE
SECTION 7

CONTENTS LIST

Display Outfits JCA/B/C
Display Outfits JD(2), JE
Display Outfits JDA Series
Display Outfit JHA(1) (To be issued later)
Display Outfit JHB (To be issued later)
Display Outfits JL, JM
Display Outfits JL1P, JM1P

Display Outfit JP2
Display Outfit JP3
Display Outfit JP4/5
Display Outfit JQ
Display Outfit JS

Display Outfit JT1
Display Outfit JUA
Display Outfits JUA(3)-(7) and Outfit QAA
Display Outfit JUC3(with 975)
Display Outfits JUD(1)(2)(3) (with 1006) (To be issued later)

Display Outfit JV1
Display Outfit JV2
Display Outfit JW
Display Outfit JW2
Display Outfit JZ

Auto Surface Plotting System JYA(1)(2)(3)
Auto Surface Plotting System JYA(4)(5)(6)
Auto Surface Plotting System JYA(7)

Display Outfit JYB
Display Outfit JYC

(Radar Plot Information) Outfit RJT(1) and RJR(1)

True Motion Outfit QAA (see JUA3) (To be issued later)
True Motion Outfit QAB

Teacher Outfit HRL(1)
Teacher Outfit HRN
Teacher Outfit HRT (To be issued later)

Bearing Resolver Outfit PAB

Radar Data Distribution Outfits PFA Series

Electronic Marker Outfits MDA–MDH
SECTION 8

CONTENTS LIST

Radar Aerial Outfit ADN
Radar Aerial Outfit AKC
Radar Aerial Outfit AKC(2)
Radar Aerial Outfit AKD
Radar Aerial Outfit AKE(1)
Radar Aerial Outfit AKE(2)
Radar Aerial Outfit AKK (see Type 903/904) (To be issued later)
Radar Aerial Outfit AKL (see Type 974 Section 6)
Radar Aerial Outfit AKN
Radar Aerial Outfit AKR
Radar Aerial Outfit AMG (see Type 957 Section 6)
Radar Aerial Outfit AMK Series (To be issued later)
Radar Aerial Outfit AML (To be issued later)
Radar Aerial Outfit AMM (To be issued later)
Radar Aerial Outfit ANS(1)(2)
Radar Aerial Outfit ANU(1)(2)(3)(4)
Radar Aerial Outfit ANU(6)
Radar Aerial Outfit AQQ(2)(3)
Radar Aerial Outfit AQR (see Types 277/293 Section 6)
Radar Aerial Outfit AQS
Radar Aerial Outfit AQT
Radar Aerial Outfit ATZ (see Type 978 Section 6)
Radar Aerial Outfit AUK (see Types 277/293 Section 6)
Radar Aerial Outfit AZF (see Type 975 Section 6)
Radar Aerial Outfit AZG (see Type 975 Section 6)
Radar Aerial Outfit AZJ (see 1006) (To be issued later)
Radar Aerial Outfit AZK (see 1006) (To be issued later)
Radar Aerial Outfit AZR
SECTION 6

CONTENTS LIST

Transmitter-Receiver 77A

Radar Type 262R, 262(2)R, 262(6)R
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Radar Type 944(M)(2)
Radar Type 954(1)(2)
Radar Type 954(M)(1)(2)

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Radar Type 992Q
Radar Type 993 (with AKD) (see 278)
    (To be issued later)
Radar Type 1006
Radar Type 1010
Radar Type 1011 (1/2)  (To be issued later)

SIF Outfit SND

Receiver Reply (Transponder) Outfit RRA

High Accuracy Receiver Outfit CEQ(1)(2)

Radar Pulse Synchronising Outfit RSD2
Radar Pulse Synchronising Outfit RSE
TRANSMITTER-RECEIVER RADAR 77A

SUMMARY OF DATA

PURPOSE

Panel 77A is a submarine X-band Radar Transmitter and Receiver for use in conjunction with a P.P.I. and A-scan ranging display and the associated aerial outfits.

BRIEF DESCRIPTION

Panel 77A houses the transmitter and receiver which is used in the Radar Type 1000 series. It is connected either to the AKS Periscope aerial or to the AKF, AKI, or AKU Warning aerials, depending on the radar Type. The Periscope or Warning aerial is selected by the Waveguide Switch on the Control Unit. The waveguide system is entirely "pre-plumbed" and includes an echo-box for spectrum analysis, thermistor bridge for measuring mean output power, and a noise source for measuring the receiver noise factor. The receiver is fitted with A.F.C. and Swept Gain.

PERFORMANCE

Frequency:
- Transmitter: 9650 MHz ± 50 MHz
- Local Oscillator: 30 MHz less than transmitter frequency
- Intermediate: 30 MHz
- Peak Power Output: 30 kW nominal, at outlet
- Pulse Repetition Frequency: 400-500 Hz or 2000-2500 Hz
- Pulse Duration: 1 microsecond or 0.2 microsecond

Receiver
- Narrow Bandwidth: 2 MHz at -3 dB
- Wide Bandwidth: 8 MHz at -3 dB
- Noise Factor: not greater than 12 dB

MAJOR UNITS

(a) Cabinet Assembly Design 62, Control, AP 62167, containing:
1. Distribution Chassis Design 4, AP 62694
2. Amplifier Chassis 45T, I.F. AP62168/A
3. R.F. Power Meter Chassis, AP 62169/A
4. Mount with Thermistor, AP 62170
5. Amplifier Chassis Design 15, Echo Box, AP 62171

(b) Cabinet Assembly Design 63, R.F. AP 62172, two in number, containing:
1. R.F. Drawer, AP 62173
2. Control and Monitor Unit Design 2 AP 65037
3. Pulse Generator Chassis, AP 62174
4. Modulator Chassis, AP 173987
5. Rectifier Chassis 63BC, 15 kW, AP 62176
6. T.R. Chassis Design 2, AP 62177
7. A.F.C. and Trigger Chassis, AP 62178
8. Timing Chassis, AP 62179
9. Pre-Amplifier Chassis, AP 62180

(c) Cabinet Assembly Design 64, Rectifier, AP 62181, containing:
1. Power Supply Drawer Design 8, AP 62182
2. Rectifier Chassis 63RD, AP 62183

(d) Waveguide Assembly Design 4, AP 62185
(e) Cable Unit, AP 62186
ASSOCIATED AERIAL OUTFITS

Type 1000(1)  Aerial Outfit AKS and AKJ
Type 1000(2)  Aerial Outfit AKS and AKJ
Type 1001     Aerial Outfit AKS and AKJ

PHYSICAL DATA

Height 5 ft 2 in at front sloping to 3 ft 7 in at rear. Width is 1 ft 10½ in Depth is 2 ft
Weight complete: 950 pounds approx.

POWER REQUIREMENTS

180 V 500 Hz or 200 V 400 Hz @ 6 amps
and either
115 V 60 Hz or 230 V 50 Hz, maximum 0.5 amps
220 V d.c. @ 1 amp

HANDBOOK

BR 2942(1)(2)

ESTABLISHMENT LIST

E 1123

INSTALLATION SPECIFICATION

8021
PURPOSE

Associated radar set of either the C.R.B.F.D. Mk. 5 fitted as part of the Medium Range System Mk. 8 or G.W. Director Mk. 21, fitted as part of the Guided Weapon System Mk. 21.

On new installations, Type 262R is fitted in both a.c. and d.c. ships. When Type 262R Units are fitted in modified Type 262Q cubicles on d.c. ships the designation is Type 262(2)R, and on a.c. ships, Type 262(6)R.

BRIEF DESCRIPTION

Radar Type 262R, fitted in C.R.B.F.D. Mk. 5, is part of the M.R.S.B. The radar beam is very narrow and the set is therefore not suitable for all-round searching and detection of targets. Range and Bearing of the target to be engaged is provided by the Gun Direction System. Type 262R then searches a small amount in range, bearing, and elevation (range ± 750 yards about the mean range, bearing ± 5°, elevation or 5° per second). When the target is detected, the search steps automatically, the radar beam is locked-on to the target and the set provides auto ranging under all conditions of operation and auto-following as applicable.

The majority of the radar operating controls are on the Control Door. Certain controls are duplicated on the C.O.'s Console. It should be noted that the Auto-Radar Switch on the Control Door is automatically switched in AUTO.

PERFORMANCE

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>9580 – 9900 MHz</td>
</tr>
<tr>
<td>Wavelength</td>
<td>3.03 – 3.13 cm</td>
</tr>
<tr>
<td>Power Output</td>
<td>Approximately 24 kW (peak)</td>
</tr>
<tr>
<td>Pulse Repetition Frequency</td>
<td>1500 pulses per second, or</td>
</tr>
<tr>
<td></td>
<td>1667 pulses per second</td>
</tr>
<tr>
<td>Pulse Duration</td>
<td>0.5 microsecond</td>
</tr>
<tr>
<td>Beam width</td>
<td>5.2° (6 dB down)</td>
</tr>
<tr>
<td>Intermediate Frequency</td>
<td>30 MHz</td>
</tr>
<tr>
<td>Receiver Bandwidth</td>
<td>Greater than 3 MHz between 3 dB points</td>
</tr>
</tbody>
</table>

MAJOR UNITS

The units are housed in watertight cubicles as follows:

- **Cubicle F1**
  - 1. AP 172181 Cabinet, Control
  - 2. AP 172165 Modulator Unit
  - 3. AP 172161 Rectifier Unit
  - 4. AP 172163 Servo Unit
  - 5. AP 172162 Search Unit

- **Cubicle F2**
  - 6. AP 172180 Control Door
  - 7. AP 172164 Auto Strobe Unit
  - 8. AP 172167 Cathode Ray Unit

- **Cubicle H**
  - 9. AP 172182 Cabinet, T/R
  - 10. AP 172160 Transmitter-Receiver Unit

- **Cubicle J**
  - 11. AP 172183 Cabinet, R.T.U.
  - 12. AP 172166 Range Transmitting Unit

- **Cubicle K**
  - 13. AP 172184 Cabinet, Blower
  - 14.(a) AP 54208 Blower Unit for d.c. installations
  - 14.(b) AP 66753 Blower Unit for a.c. installations
  - 15. AP 172168 Control Unit fitted as integral part of C.O.'s Console

AERIAL OUTFIT

Aerial Outfit APE(2) which consists of a parabolic reflector fed by a flare from the waveguide system. The aerial reflector rotates at 1800 r.p.m.

POWER REQUIREMENTS

- 440 V 60 Hz 3-phase for radar generator in a.c. ships.
- 220 V d.c. for radar generator in d.c. ships.

HANDBOOKS

BR 2302(A) and BR 2302(6) Series

E 1281, E 1331
RESTRICTED

TYPES 277P/Q AND 293P/Q

SUMMARY OF DATA

PURPOSE

Type 277P/Q provides facilities for height-finding and surface warning.
Type 293P/Q provides facilities for close range air and surface warning, with special application to target indication.

BRIEF DESCRIPTION

Types 277P/Q, 293P/Q are similar in all respects except for their aerial systems. Types 277P/Q are intended for accurate height-finding of targets indicated on other sets, the operation of height-finding being carried out, normally, on a Height Position Indicator. When a H.P.I. is not fitted or in an emergency an approximation can be obtained by elevating the aerial for maximum echo. Types 293P/Q are used for target indication, the bearing accuracy of these sets being very high. They can also be used, when fitted with Display Outfit JN, to train Types 277P/Q on to any target for height finding.

The radar office, besides containing the modulator, transmitter and receiver panels also contains a display outfit and aerial control unit although these are not normally used for operational purposes, control being from the R.D.R. Thus the office can be used as an emergency operating position except for height-finding as no H.P.I. is fitted in the Type 277P/Q office.

PERFORMANCE

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>2940 MHz – 3060 MHz (9.8 Hz – 10.2 Hz)</td>
</tr>
<tr>
<td>Power Output</td>
<td>400 kW (peak)</td>
</tr>
<tr>
<td>Pulse Repetition Frequency</td>
<td>500 pulses per second</td>
</tr>
<tr>
<td>Beam width</td>
<td>Type 277P with Aerial Outfit AUX 4.5° horizontal</td>
</tr>
<tr>
<td></td>
<td>Type 277Q with Aerial Outfit ANU 4.5° horizontal</td>
</tr>
<tr>
<td></td>
<td>Type 293Q with Aerial Outfit AQR 2.5° horizontal</td>
</tr>
<tr>
<td></td>
<td>Type 293Q with Aerial Outfit ANS 2.0° horizontal</td>
</tr>
<tr>
<td></td>
<td>All beam widths are at half field strength</td>
</tr>
<tr>
<td>Pulse Length</td>
<td>0.7 or 1.0 MHz</td>
</tr>
<tr>
<td>Intermediate Frequency</td>
<td>13.5 MHz</td>
</tr>
<tr>
<td>Receiver Bandwidth</td>
<td>4 MHz, 1 MHz or 0.5 MHz</td>
</tr>
<tr>
<td>Heat Dissipation</td>
<td>4.5 kW (approx.)</td>
</tr>
</tbody>
</table>

REstricted
MAJOR UNITS

(a) Transmitter and Modulator
1. AP 66501B Panel 3CC Rectifying and Modulating
2. AP 66502A Trigger Unit Design 10
3. AP 23287A Wamonitor C86
4. AP 66177A Transmitter 9T
5. AP W7556 Soundproof Cabinet for Blower
6. AP W9253 Blower

(b) Receiver Outfit CEL
7. AP 58363 Panel L53 (Receiving)
8. AP 58222 Frequency Changer Unit Design 6
9. AP 58234 Cathode Ray Unit Design 36
10. AP 58396 I.F. Amplifier Design 7
11. AP 58397 Cathode Follower Unit Design 12
12. AP 58399 Control Unit Design 37
13. AP 58395 Oscillator C225
14. AP 58000 Meter Unit Design 4
15. AP 57496 I.F. Amplifier Design 5
16. AP 6811A Rectifier Unit S.E.6

(c) Test Equipment
17. AP 53915 WaveMeter C93
18. AP 56807 Standing Wave Ratio Indicator Design 4
19. AP 66584 Meter Unit Field Strength (Waveguide)
20. AP 66765 Spectrometer Cavity Resonator Unit
21. AP 66766 Spectrometer Display Unit
22. AP 66848 Signal Generator Noise
23. AP 60980 S.K.R. Indicator Multi-neon

(d) Miscellaneous Equipment
24. AP 53198 Cathode Follower Unit 6 way
25. AP 53197 Cathode Follower Unit Design 5
26. AP W826/A Air Conditioning Unit Design S.E.2
27. AP 50679 Board 2AF Changeover Design 2
28. AP W9199 Matching Unit Adjustable Design 4
29. AP 56773 Aerial Matching Unit

NOTE: Test Equipment, Items 20, 21 are designed to replace Item 17, but are only issued for Types 2939/p. Type 2777/p will retain Item 17.

PHYSICAL DATA

Type 2777p/q

Weight of office equipment (Destroyers) 224 cwt
Weight of office equipment (Cruisers) 264 cwt
Dimensions of office - 11 ft by 7 ft divided into two sections
(a) 6 ft by 7 ft containing Receiving equipment
(b) 5 ft by 7 ft containing Transmitter equipment

Type 2939/p/q

Weight of office equipment (Destroyers) 25 cwt
Weight of office equipment (Cruisers) 29 cwt
Weight of Amplidyne Generator and Starter (2939) 3 cwt
Dimensions of office - 12 ft by 8 ft divided into two sections
(a) 7 ft by 8 ft containing Receiving equipment
(b) 7 ft by 8 ft containing Transmitting equipment

The Amplidyne Generator fitted with Type 2939 is 2 ft 11 ins long, 14 ins wide and 1 ft 11 ins high and is sited outside but adjacent to Type 2939 office.

TEACHER OUTFIT

Teacher Oufit: HRL

POWER REQUIREMENTS

230 V 50 Hz 3 phase
180 V 500 Hz
220 V d.c.

24 V d.c.
50 V 50 Hz 3 phase

AERIAL OUTFIT AUX
AERIAL OUTFIT ANU
AERIAL OUTFIT ANR

N.B. THE ILLUSTRATIONS
OF AERIALS ARE
NOT TO SCALE
ASSOCIATED POWER SUPPLY OUTFITS

<table>
<thead>
<tr>
<th></th>
<th>Frigates</th>
<th>Destroyers and Above</th>
<th>Ships fitted with Type 960</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(a)</td>
<td>(b)</td>
<td>(a)</td>
</tr>
<tr>
<td>Type 277P/Q</td>
<td>DUC</td>
<td>DPF</td>
<td>DVH</td>
</tr>
<tr>
<td>Type 293P/Q</td>
<td>DUG</td>
<td>DPB</td>
<td>DVH</td>
</tr>
<tr>
<td>Types 277P/Q</td>
<td></td>
<td></td>
<td>DVH From D.E.E. sources</td>
</tr>
<tr>
<td>and 293P/Q</td>
<td>(a) 180 V 50 Hz 3 phase</td>
<td>(b) 230 V 50 Hz 3 phase</td>
<td>DVH</td>
</tr>
</tbody>
</table>

ASSOCIATED AERIAL OUTFITS

Type 277P - Aerial Outfit AUK  Type 277Q - Aerial Outfit ANU
Type 293P - Aerial Outfit AGR  Type 293Q - Aerial Outfit ANS
(See separate Summary of Data Sheets)

HANDBOOK

BR 2106(1)(2)

ESTABLISHMENT LIST

E529 Types 277P/Q, 293P/Q

INSTALLATION SPECIFICATION

B626 Type 277P  B659 Type 277Q
B721 Type 293P  B711 Type 293Q
RESTRICTED

RADAR TYPES 278, 993, 986 AND 987
OFFICE EQUIPMENT
SUMMARY OF DATA

PURPOSE

A general purpose receiver-transmitter complete in itself, intended to be associated with a wide range of aerial and display units to form a complete S-band radar equipment.

BRIEF DESCRIPTION

The magnetron is driven by a hydrogen thyratron modulator, the pulse-forming network being locally or remotely switched to one of two pulse lengths; synchronisation can be internal or external. A pre-pulse output is available to trigger an I.F.F. interrogator on internal synchronisation only. The magnetron, duplexer, local oscillator and its controls, are grouped in a single unit.

The receiver channel consists of a balanced crystal mixer feeding an I.F. pre-amplifier. Two linear and two logarithmic I.F. amplifiers are used, one linear and one logarithmic together for each of the two bandwidths. Kilayas, local or remote controlled, select the desired bandwidths. The linear I.F. amplifiers may be controlled by a sampling a.g.c. system and a sharp gain waveform of variable amplitude and duration can also be applied. The logarithmic I.F. amplifiers feed one cathode follower and the linear I.F. amplifiers feed another. Both cathode followers are taken to a switch-bank which selects logarithmic or linear video output which is then taken through ten video cathode followers. Any combination of linear and logarithmic outputs is available, up to a total of ten. The local oscillator of the receiver is controlled by an electronic a.f.c. system with its own tuning meter.

Power supplies are self-contained and stabilised as required. The e.h.t. supply is also self-contained and is manually adjustable. A comprehensive interlock and electronic fault-protection system is incorporated.

A waveguide switch is built in and enables the Receiver-Transmitter to be connected to an aerial, to an external dummy load, or to a built-in S-Band noise source for noise factor measurement.

Incorporated test facilities comprise, wavemeter, i.f. step attenuator, calibrated directly in noise factor, and a r.f. power meter which may be switched to a radiated power monitor at the aerial head. Important voltages and currents are monitored from unit switch positions. The equipment houses a CT2 wavemeter which displays selected unit waveforms, transmitter spectrum, a.f.c. discriminator curve and external I.F.F. video pulse.

PERFORMANCE

Power Output: 600 KW peak nominal
Pulse Repetition Frequency: (a) Internal Trigger 400 or 500 p/s
(b) External Trigger 100 to 550 p/s
Pulse Length: 0.5 µs or 2.0 µs
Receiver Bandwidth: 0.85 MHz or 3.0 MHz switched
Intermediate Frequency: 30 MHz

Basic Composition of Each Type

<table>
<thead>
<tr>
<th>TYPE</th>
<th>AERIAL OUTFIT</th>
<th>PEDESTAL UNIT</th>
<th>AERIAL CONTROL UNIT</th>
<th>OFFICE EQUIPMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>278(1)</td>
<td>ANU(1)</td>
<td>AP 67541A</td>
<td>AP 65743B</td>
<td>AP 173047</td>
</tr>
<tr>
<td>278(2)</td>
<td>ANU(2)</td>
<td>AP 64620</td>
<td>AP 70210</td>
<td>Cabinet Radar</td>
</tr>
<tr>
<td>278(3)</td>
<td>ANU(3)</td>
<td>AP 67541B</td>
<td>AP 65743B</td>
<td>,</td>
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<tr>
<td>278(4)</td>
<td>ANU(4)</td>
<td>AP 66205</td>
<td>AP 70210</td>
<td>Cabinet Power</td>
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<tr>
<td>278(5)</td>
<td>ANU(5)</td>
<td>AP 186065</td>
<td>AP 186054</td>
<td>186050</td>
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<tr>
<td>278(6)</td>
<td>ANU(6)</td>
<td>AP 64620</td>
<td>AP 186054</td>
<td>Cabinet Power</td>
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<tr>
<td>993</td>
<td>AKD</td>
<td>AP 186290</td>
<td>AP 186365</td>
<td>186050</td>
</tr>
<tr>
<td>986</td>
<td>AKH</td>
<td>AP 62254</td>
<td>AP 57592</td>
<td>Cabinet Power</td>
</tr>
<tr>
<td>987</td>
<td>AQET</td>
<td>AP 65128</td>
<td>AP 57592</td>
<td>and Video</td>
</tr>
</tbody>
</table>

RESTRUCTED
RESTRICTED

Outputs for Display Units:
(a) Video output - ten channels +5 V peak into 68 ohms
(b) Trigger output - single coaxial line into standard AP junction box giving ten outputs, each +10 V peak into 68 ohms, coincident with transmitted pulse.

Triggers for External Equipment:
(a) I.F. Pre-pulse 36.5 μs before transmitted pulse, +15 V peak into 68 ohms, 1 μs duration.
(b) Monitor pre-pulse 2 to 4 μs before transmitted pulse, 13 V ± 5 V peak into 68 ohms, 1 μs duration.

MAJOR UNITS

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Height</th>
<th>Width</th>
<th>Depth</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>5840-173049 Modulator</td>
<td>18 in</td>
<td>22 in</td>
<td>27 in</td>
<td>192 lb</td>
</tr>
<tr>
<td>2.</td>
<td>5840-173048 Receiver-Transmitter</td>
<td>30 in</td>
<td>22 in</td>
<td>27 in</td>
<td>364 lb</td>
</tr>
<tr>
<td>3.</td>
<td>5840-173056 Tuning Unit S.F. (3 in No.)</td>
<td>21½ in</td>
<td>6½ in</td>
<td>17 in</td>
<td>50 lb</td>
</tr>
<tr>
<td>4.</td>
<td>5840-173052 Control, Power Supply</td>
<td>9½ in</td>
<td>27 in</td>
<td>27 in</td>
<td>106 lb</td>
</tr>
<tr>
<td>5.</td>
<td>5840-173051 Amplifier I.F. and Video</td>
<td>12 in</td>
<td>22 in</td>
<td>27 in</td>
<td>68 lb</td>
</tr>
<tr>
<td>6.</td>
<td>5840-173054 Power Supply</td>
<td>12 in</td>
<td>22 in</td>
<td>27 in</td>
<td>147 lb</td>
</tr>
<tr>
<td>7.</td>
<td>5840-173053 Power Supply E.H.T.</td>
<td>19½ in</td>
<td>14 in</td>
<td>22 in</td>
<td>111 lb</td>
</tr>
<tr>
<td>8.</td>
<td>5840-173047 Cabinet Radar</td>
<td>72 in</td>
<td>14 in</td>
<td>30 in</td>
<td>350 lb</td>
</tr>
<tr>
<td>9.</td>
<td>5840-173050 Cabinet Power and Video</td>
<td>72 in</td>
<td>24 in</td>
<td>30 in</td>
<td>435 lb</td>
</tr>
</tbody>
</table>

Items 1-3 are part of Item 8.
Items 4-7 are part of Item 9.

POWER REQUIREMENTS AND CONSUMPTION

440 V, 3 phase, 50-60 Hz 3.2 kVA.
Anti-condensation heaters 115 V a.c. or 220 V d.c., 200 VA

VENTILATION

An external forced air supply of 650 cu. ft/min. at 1 inch water gauge and maximum inlet temperature 46 °C. is required.

HANDBOOK

BR 2358(1)(2)

ESTABLISHMENT LIST

E 1280

INSTALLATION SPECIFICATION

8900
PURPOSE

I.F.F. Mk. 10 Interrogator fitted in conjunction with Type 960.

BRIEF DESCRIPTION

The Mark 10 system of I.F.F. is a pulsed secondary radar in which a signal transmitted from an interrogator in the ship is received by a transponder fitted in the craft under observation. The transponder then sends back an appropriate reply which is detected by the receiving part of the interrogator and distributed for display. Three "modes" of operation are available for general, personal and functional identification.

In the Type 944(1) the interrogator transmitter is triggered by the Type 960 Master Trigger Unit, the aerial is included in the Type 960 aerial assembly and rotates with it and the I.F.F. responses are displayed on the Type 960 display. The Coder-Decoder selects the required "mode" of I.F.F. by remote control from Master Control Units fitted at remote display positions. The main items of equipment are fitted in the Type 960 office.

FREQUENCY

1030 MHz Transmission
1059 MHz Reception

WAVELENGTH

29.12 cm Transmission
27.52 cm Reception

POWER OUTPUT

1 kW approximately

PULSE REPETITION FREQUENCY

250 pulses per second (from Master Trigger Unit)

PULSE LENGTH

1 microsecond approx. from transmitter, lengthened to 4.5 microseconds approx. for display.

INTERMEDIATE FREQUENCY

59.9 MHz

RECEIVER BANDWIDTH

8 MHz to 11 MHz at 6 dB down.

BEAM WIDTH

7 degrees at half power points.

MAJOR UNITS

(a) American Items

(i) Receiver-Transmitter RT-194A/UPX-1(MSA)
(ii) Coder-Decoder KY-61A/UPX-1(MSA)
(iii) Interrogator Antenna AT-352/UPA-22A(MSA)
(iv) Test Antenna AS-177/UPX(MSA)
(v) Test Set AN/UPM-6B(MSA)

Part of AN/UPX-1A(MSA)
Part of Aerial Outfit AMB
(b) British items. The following items of British design are collectively known as Accessory Outfit FFA:

(i) AP 64221 Cabinet Design 129
(ii) AP 64224 Cabinet Design 132
(iii) AP 64227 Video Distribution Unit (1 or 2 in No.)
(iv) AP 64239 Pulse Lengthening Unit Design 2
(v) AP 64236 Tray, Servicing, with Runners
(vi) AP 64235 Tray, Servicing (2 in No.)
(vii) AP 64228 Mixer Control Unit [All modes] (No. as required)
(viii) AP 64229 Mixer Control Unit Design 2
(ix) AP 64237 Box, with Terminating Resistors

PHYSICAL DATA

Office Equipment: Height 6 ft  Width 22 in  Depth 28 in  Weight 600 lb

ASSOCIATED AERIAL OUTFIT

Aerial Outfit AMB (part of Type 944(1)), comprising:

Interrogator Antenna AT-352/UPA-22A(MSA)
Test Antenna AS-177/UPX(MSA)

NOTE: The Interrogator antenna is fitted as an integral part of the Type 960 aerial AQQ(2) and AQQ(3).

POWER REQUIREMENTS

115 V 50/60 Hz single phase 750 watts
220/230 V d.c. or a.c. 210 watts
24 V d.c. 100 watts

Extra for additional Video Distribution Unit:
115 V 50/60 Hz single phase 185 watts
220/230 V d.c. or a.c. 45 watts

Heat Dissipation in Office 1 kW approx.

REMARKS

The main items of Interrogator equipment, although made in the United Kingdom, are of American design and have been supplied under the Mutual Defence Aid Programme. The video distribution unit and other items necessary to link the I.F.F. Mk. 10 System with British radars have been designed in the United Kingdom.

HANDBOOK

BR 2174

ESTABLISHMENT LIST

E 1128

INSTALLATION SPECIFICATIONS

8931 Type 944(1)
8927 Aerial Outfits AQQ and AMB
TYPE 944(2)

SUMMARY OF DATA

PURPOSE

I.F.F. Mk. 10 interrogator co-ordinated with Types 277/293.

BRIEF DESCRIPTION

The Mark 10 I.F.F. System is a pulsed secondary radar in which a signal transmitted from an interrogator in the ship is received by a transponder fitted in the craft under observation. The transponder then sends back an appropriate reply which is detected by the receiving part of the interrogator and distributed for display. Three 'modes' of operation are available for general, personal and functional identification.

Type 944(2) comprises (a) I.F.F. Mk.110 co-ordinated with radar Types 277 or 293 or (b) unco-ordinated. In (a) the I.F.F. aerial rotation is co-ordinated with that of the main air-warning radar and the I.F.F. responses are superimposed on the radar video to provide a mixed display. In (b) the I.F.F. interrogator is completely independent, having its own exclusive display arrangements.

FREQUENCY

1030 MHz Transmission
1090 MHz Reception

POWER OUTPUT

1 kW approximately

PULSE REPETITION FREQUENCY

Co-ordinated – 250 pulses per second
{from radar trigger unit}
Unco-ordinated – 400 pulses per second.

PULSE LENGTH

1 μs approximately from transmitter, lengthened to 4.5 μs approximately for display

INTERMEDIATE FREQUENCY

59.5 MHz

RECEIVER BANDWIDTH

8 MHz to 12 MHz at 6 dB down.

BEAM WIDTH

14 degrees at half-power points.

MAJOR UNITS

(a) American Items

(i) Receiver-Transmitter RT-194A/UPX-1 (MSA)

(ii) Coder-Decoder KY-61A/UPX (MSA)

(iii) Electronic Control Amplifier AM-1369/UP (MSA)

(iv) Antenna AT-353A/UPA-23A (MSA)

(v) Antenna Pedestal AB-447/UP (MSA)

(vi) Motor Generator PU-343/U (MSA)

(vii) Test Set AN/UPM-6B (MSA)
(b) British Items

The following items of British design are collectively known as Accessory Outfit FFB:-

(i) AP 64222 Cabinet Design 130
(ii) AP 64234 Cabinet Design 196
(iii) AP 64239 Pulse Lengthening Unit Design 2
(iv) AP 64235 Tray Servicing (2 in number)
(v) AP 64236 Tray Servicing with runners
(vi) AP 64228 Mixer Control Unit (all Modes) No. as required
(vii) AP 64229 Mixer Unit Design 2
(viii) AP 64237 Box, with Terminating Resistors
(ix) AP 64238 Aerial Control Unit 418 (Part of Aerial Outfit AMC)

ASSOCIATED AERIAL OUTFIT

Aerial Outfit AMC (Part of Type 944(2)).

PHYSICAL DATA

<table>
<thead>
<tr>
<th>Component</th>
<th>Height</th>
<th>Width</th>
<th>Depth</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cabinets</td>
<td>6 ft</td>
<td>1 ft 10 in</td>
<td>2 ft 4 in</td>
<td>550 lb</td>
</tr>
<tr>
<td>Aerial Control Unit</td>
<td>1 ft</td>
<td>1 ft 1 in</td>
<td>1 ft</td>
<td>50 lb</td>
</tr>
<tr>
<td>Motor Generator</td>
<td>1 ft 4 in</td>
<td>10 in</td>
<td>2 ft 1 in</td>
<td>155 lb</td>
</tr>
<tr>
<td>Aerial and Pedestal</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>210 lb</td>
</tr>
</tbody>
</table>

POWER REQUIREMENTS

115 V 50/60 Hz single phase main supply 2.5 kVA (9 kVA for 0.6 sec. during start up of aerial system)
115/220/230 V d.c. or a.c. 210 W for anti-condensation heaters
24 V d.c. 40 W for mixer units
In unco-ordinated installations, additional for aerial control unit:
115 V 50/60 Hz single phase 50 W
24 V d.c. 50 W

Heat dissipation in office 1 kW approx.

REMARKS

The main items of Interrogator equipment although made in the United Kingdom, are of American design and have been supplied under the Mutual Defence Aid Programme. The items necessary to link the I,F,F. Mk. 10 System with British radars have been designed in the United Kingdom.

HANDBOOK

BR 1379

ESTABLISHMENT LIST

E 1127

INSTALLATION SPECIFICATION

B 833
PURPOSE

I.F.F. Mark 10 Interrogator with Selective Identification Feature (S.I.F.) integrated with Radar Types 960 or 965M

BRIEF DESCRIPTION

The Mark 10 system of I.F.F. with S.I.F. is a pulsed secondary radar in which a signal transmitted from an Interrogator in the ship is received by a Transponder in the craft and observed. The Transponder then sends back a reply in the form of a coded pulse train for each interrogation. This is detected by the receiving part of the Interrogator and then converted to a single pulse by S.I.F. decoders and distributed for display. The equipment may be switched to basic operation if required when the S.I.F. decoding circuits will be bypassed. Three modes of operation are available.

In the case of Type 944M(1) the Interrogator transmitter is triggered by the Type 960 or Type 965M trigger unit. The aerial is mounted on the radar aerial and rotates with it and the I.F.F. responses are displayed on the radar displays. The Control Units are fitted adjacent to each display by means of which the operator can set the mode and S.I.F. code required. The main items of equipment are fitted in the radar room. S.I.F. Decoders are fitted in cabinets in or adjacent to display rooms.

FREQUENCY

1030 MHz Transmission
1090 MHz Reception

POWER OUTPUT

3 kW approximately

PULSE REPERITION FREQUENCY

(Pulses per second)
250 from Type 960 Master Trigger Unit
380 or 190 from Type 965M External Trigger Unit

PULSE DURATION

Transmitter – 1 microsecond
Reply (decoded) – 0.75 microsecond pulse lengthened to 4.0 microseconds approximately for display.

INTERMEDIATE FREQUENCY

59.5 MHz

RECEIVER BANDWIDTH

8 MHz to 11 MHz at 6 dB down.

AERIAL BEAM WIDTH

7 degrees at half-power points.

MAJOR UNITS

(a) Items of American Design.

(i) Receiver-Transmitter RT-194A/UPX-1 (MSA)
(ii) Coder-Decoder KY-61A/UPX-1 (MSA)
(iii) Radar Test Set AN/UPM-68 (MSA)

Part of Radar Recognition
Set AN/UPX-1A (MSA)
**RESTRICTED**

(b) **Accessory Outfit FFA**

<table>
<thead>
<tr>
<th>Pattern No.</th>
<th>Description</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) 64221</td>
<td>Cabinet Design 129 Mod. 1</td>
<td></td>
</tr>
<tr>
<td>(ii) 64224</td>
<td>Cabinet Design 132</td>
<td></td>
</tr>
<tr>
<td>(iii) 64227</td>
<td>Video Distribution Unit</td>
<td></td>
</tr>
<tr>
<td>(iv) 64229</td>
<td>Mixer Control Unit Design 2</td>
<td>Numbers vary with Installation.</td>
</tr>
</tbody>
</table>

(c) **S.I.F. Outfit SNA**

<table>
<thead>
<tr>
<th>Pattern No.</th>
<th>Description</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) 5895-AP 164334</td>
<td>Decoder, Passive</td>
<td>Numbers vary with Installation</td>
</tr>
<tr>
<td>(ii) 5895-AP 164340</td>
<td>Stand, Cabinet Mounting</td>
<td></td>
</tr>
<tr>
<td>(iii) 5895-AP 164341 Cabinet, Distribution Section</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iv) 5895-AP 164342 Cabinet, 2 Decoder Section</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(v) 5895-AP 164343 Cabinet, 3 Decoder Section</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(vi) 5895-AP 164336 Mixer Control Unit (All Modes)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(vii) 5895-AP 164336 Decoder, Distress</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(viii) 5895-AP 164335 Control, Coder, Mode 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ix) 5895-AP 164397 Coder, Transponder (Supplied for use as a Test Set)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**PHYSICAL DATA**

<table>
<thead>
<tr>
<th>Interrogator Equipment in Cabinet</th>
<th>Height</th>
<th>Width</th>
<th>Depth</th>
<th>Weight (approx.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cabinets with Decoders:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Decoders</td>
<td>6 ft 0 in</td>
<td>22 in</td>
<td>28 in</td>
<td>600 lb</td>
</tr>
<tr>
<td>3 Decoders</td>
<td>3 ft 6 in</td>
<td>22 in</td>
<td>26 in</td>
<td>285 lb</td>
</tr>
<tr>
<td>4 Decoders</td>
<td>4 ft 10 in</td>
<td>22 in</td>
<td>26 in</td>
<td>385 lb</td>
</tr>
<tr>
<td>5 Decoders</td>
<td>6 ft 0 in</td>
<td>22 in</td>
<td>26 in</td>
<td>500 lb</td>
</tr>
</tbody>
</table>

**POWER REQUIREMENTS**

<table>
<thead>
<tr>
<th></th>
<th>115V 50/60 Hz Single Phase</th>
<th>115 or 220V for heaters</th>
<th>24V D.C.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interrogator Cabinet</td>
<td>670 watts</td>
<td>210 watts (220V only)</td>
<td>0.1A + 0.35A for each passive decoder and M.C.U. (all Modes) combined.</td>
</tr>
<tr>
<td>Decoder Passive Mode 1</td>
<td>200 VA (the supply can also be 230 V)</td>
<td>30 watts</td>
<td>0.05A</td>
</tr>
<tr>
<td>Decoder, Distress</td>
<td>70 VA</td>
<td>10 watts</td>
<td>0.05A</td>
</tr>
<tr>
<td>Decoder Cabinet, for each</td>
<td>200 VA (the supply can also be 230 V)</td>
<td>30 watts</td>
<td></td>
</tr>
<tr>
<td>Decoder, Passive</td>
<td>50 VA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coder, Transponder Test Set</td>
<td>185 watts</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Heat dissipation in office: 1 kW approximately.

**ASSOCIATRD AERIAL OUTFIT**

Aerial Outfit AM8, comprising Interrogator Antenna AT-352/UPA-22A (MSA) Test Antenna AS-177/UPX (MSA) (with Type 960 only).

**REMARKS**

The main items of interrogator equipment are of American design, although manufactured in the United Kingdom under the Mutual Security Act (MSA) agreement. Cabinets, S.I.F. decoders and items necessary to link the T.F.T. Mark 10 system with British radars are of British design and manufacture.

**HANDBOOK**

BR 2330

**ESTABLISHMENT LISTS**

Type 944M(1) E1127
Outfit AMB E1171
Outfit FFA E1172
Outfit SNA E1162
Test Set AN/UPM-6B (MSA) AE52

**INSTALLATION SPECIFICATION**

BB31

**RESTRICTED**
PURPOSE

I.F.F. Mark 10 interrogator with selective identification feature (S.I.F.), co-ordinated with primary radar, or unco-ordinated.

BRIEF DESCRIPTION

The Mark 10 system of I.F.F. with S.I.F. is a pulsed secondary radar in which a signal transmitted from an interrogator in the ship is received by a transponder in the craft under observation. The transponder then sends back a reply in the form of a coded pulse train for each interrogation. This is detected by the receiving part of the interrogator and then converted to a single pulse by S.I.F. decoders and distributed for display. The equipment may be switched to basic operation if required, when the S.I.F. decoding circuits will be by-passed. Three modes of operation are available.

Type 944M(2) comprises (a) I.F.F. Mark 10 co-ordinated with a primary radar or (b) unco-ordinated. In (a) the I.F.F. aerial rotation is co-ordinated with the radar aerial rotation and the I.F.F. responses are superimposed on the radar video to provide a mixed display. In (b) the I.F.F. interrogator is completely independent, having its own exclusive display arrangements.

FREQUENCY

1030 MHz transmission.
1090 MHz reception.

POWER OUTPUT

1 kW approximately.

PULSE REPETITION FREQUENCY

Co-ordinated – the nearest sub-multiple of the radar b.r.f. below 400 (e.g. 250 pulses per second for a 500 kHz radar).
Unco-ordinated – 400 pulses per second.

PULSE DURATION

1 μs from transmitter. Reply (decoded) 0.75 μs pulse lengthened to 4.0 μs approximately for display.

INTERMEDIATE FREQUENCY

59.5 MHz

RECEIVER BANDWIDTH

8 MHz to 11 MHz at 6 dB down.

AERIAL BEAM WIDTH

14 degrees at half-power points.

MAJOR UNITS

Items of American Design

1. Receiver-Transmitter RT-394A/UPX-1 (MSA)
2. Coder-Decoder KY-61A/UPX-1 (MSA)
3. Radar Test Set AN/UPM-6A (MSA)

Part of Radar Recognition Set AN/UPX-1A (MSA)
REstricted

Accessory Outfit FFB

<table>
<thead>
<tr>
<th>Pattern No.</th>
<th>Description</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 64222</td>
<td>Cabinet Design 130 Mod. 1</td>
<td></td>
</tr>
<tr>
<td>2. 64234</td>
<td>Cabinet Design 196</td>
<td></td>
</tr>
<tr>
<td>3. 64229</td>
<td>Mixer Control Unit Design 2</td>
<td>Numbers vary with installation.</td>
</tr>
<tr>
<td>4. 64230</td>
<td>Aerial Control Unit 418</td>
<td>Unco-ordinated installations only. Only when more than five displays are required to show I.F.F. signals.</td>
</tr>
<tr>
<td>5. 64227</td>
<td>Video Distribution Unit</td>
<td></td>
</tr>
</tbody>
</table>

S.L.F. Outfit SNA

<table>
<thead>
<tr>
<th>Pattern No.</th>
<th>Description</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 5895-AP 164334</td>
<td>Decoder, Passive</td>
<td></td>
</tr>
<tr>
<td>2. 5895-AP 164340</td>
<td>Stand, Cabinet Mounting</td>
<td></td>
</tr>
<tr>
<td>3. 5895-AP 164341</td>
<td>Cabinet, Distribution Section</td>
<td>Numbers vary with installation.</td>
</tr>
<tr>
<td>4. 5895-AP 164342</td>
<td>Cabinet, 2 Decoder Section</td>
<td></td>
</tr>
<tr>
<td>5. 5895-AP 164343</td>
<td>Cabinet, 3 Decoder Section</td>
<td></td>
</tr>
<tr>
<td>6. 5895-AP 164330</td>
<td>Mixer Control Unit (All Modes)</td>
<td></td>
</tr>
<tr>
<td>7. 5895-AP 164336</td>
<td>Decoder, Distress</td>
<td></td>
</tr>
<tr>
<td>8. 5895-AP 164335</td>
<td>Control, Coder, Mode 1</td>
<td></td>
</tr>
<tr>
<td>9. 5895-AP 164337</td>
<td>Coder, Transponder (Supplied for use as a Test Set)</td>
<td></td>
</tr>
</tbody>
</table>

Physical Data

<table>
<thead>
<tr>
<th>Description</th>
<th>Height</th>
<th>Width</th>
<th>Depth</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interrogator Cabinet with equipment</td>
<td>6 ft</td>
<td>12 in</td>
<td>10 in</td>
<td>550 lb</td>
</tr>
<tr>
<td>Aerial Control Unit 418</td>
<td>18 in</td>
<td>12 in</td>
<td>28 in</td>
<td>50 lb</td>
</tr>
<tr>
<td>Motor Generator</td>
<td>16 in</td>
<td></td>
<td>10 in</td>
<td>155 lb</td>
</tr>
<tr>
<td>Aerial, with Pedestal</td>
<td></td>
<td></td>
<td></td>
<td>210 lb</td>
</tr>
<tr>
<td>Cablins with S.L.F. decoders</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 decoders</td>
<td>3 ft 6 in</td>
<td>22 in</td>
<td>26 in</td>
<td>285 lb</td>
</tr>
<tr>
<td>3 decoders</td>
<td>4 ft 10 in</td>
<td>22 in</td>
<td>26 in</td>
<td>385 lb</td>
</tr>
<tr>
<td>4 decoders</td>
<td>5 ft 2 in</td>
<td>22 in</td>
<td>26 in</td>
<td>500 lb</td>
</tr>
<tr>
<td>5 decoders</td>
<td>6 ft 0 in</td>
<td>22 in</td>
<td>26 in</td>
<td>600 lb</td>
</tr>
</tbody>
</table>

Power Requirements

<table>
<thead>
<tr>
<th>Description</th>
<th>115 V, 50/60 Hz</th>
<th>115 or 220 V for heaters</th>
<th>24 V d.c.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interrogator Cabinets complete</td>
<td>2.5 kW (9.25 kW starting)</td>
<td>250 watts</td>
<td>0.1A + 0.35A for each passive decoder and M.C.U.</td>
</tr>
<tr>
<td>Decoder, Passive Mode 1</td>
<td>200 VA (the supply can also be 230 V)</td>
<td>30 watts</td>
<td>0.05A</td>
</tr>
<tr>
<td>Decoder, Distress</td>
<td>70 VA</td>
<td>10 watts</td>
<td>0.05A</td>
</tr>
<tr>
<td>Decoder Cabinet, for each Decoder, Passsive</td>
<td>200 VA (the supply can also be 230 V)</td>
<td>30 watts</td>
<td>0.05A</td>
</tr>
<tr>
<td>Aerial Control Unit 418 (when fitted)</td>
<td>50 watts</td>
<td>45 watts</td>
<td>50 watts</td>
</tr>
<tr>
<td>Video Distribution Unit (when fitted)</td>
<td>185 watts</td>
<td>45 watts</td>
<td>50 watts</td>
</tr>
<tr>
<td>Coder, Transponder Test Set</td>
<td>50 VA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Heat dissipation in office 1 kW approximately

Remarks

The main items of interrogator equipment are of American design, although manufactured in the United Kingdom under the Mutual Security Aid (MSA) agreement. Cabinets, S.L.F. decoders and items necessary to link the I.F.F. Mark 10 system with British radars are of British design and manufacture.

Handbook

BR 2355

Establishment Lists

<table>
<thead>
<tr>
<th>Type</th>
<th>942AM(2)</th>
<th>E1127</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outfit</td>
<td>AM</td>
<td>E1171</td>
</tr>
<tr>
<td>Outfit FFB</td>
<td>E1172</td>
<td></td>
</tr>
<tr>
<td>Outfit SNA</td>
<td>E1262</td>
<td></td>
</tr>
<tr>
<td>Test Set AWM/UPM-6N(MSA)</td>
<td>AE25</td>
<td></td>
</tr>
</tbody>
</table>

Associated Aerial Outfit

<table>
<thead>
<tr>
<th>Installation Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerial Outfit AMC or AME.</td>
</tr>
</tbody>
</table>
PURPOSE

I.F.F. Mark 10 Transponder for replying to I.F.F. Mark 10 Interrogators.

BRIEF DESCRIPTION

Types 954(1) and 954(2) are the shipborne transponders for replying to I.F.F. Mark 10 Interrogators. Both sets employ the same items of transponder equipment, but Type 954(2) includes Test Set AN/UPM-68 (MSA) in addition and is fitted in cases where it is not possible to utilise the test set provided with Types 944(1) or 944(2). In Type 954(1) the test set space is available for additional units which may be fitted at a later date.

The interrogations are received as pulse pairs on a frequency of 1030 MHz. These interrogations are converted to video signals in the Receiver-Transmitter RT-269/UPX-5 from whence they are passed to the Decoder KY-88/UPX-5 which generates a single pulse for each correct interrogation. These pulses are fed to the modulator of the transmitter, the output of which is fed to the antenna and radiated on 1090 MHz as replies to the interrogations.

FREQUENCY

1030 MHz Reception
1090 MHz Transmission

POWER OUTPUT

300 W (peak) approximately

PULSE REPETITION FREQUENCY

Up to 4000 p/s (depending on interrogator).

PULSE LENGTH

1 microsecond approximately.

INTERMEDIATE FREQUENCY

59.5 MHz

RECEIVER BANDWIDTH

8 MHz to 11 MHz at 6 dB down.

BEAM WIDTH

Omni-directional

MAJOR UNITS

(a) American Items

(i) Receiver-Transmitter RT-269/UPX-5 (MSA)
(ii) Decoder KY-88/UPX-5 (MSA)
(iii) Radar Set Control C-1076/UPX-5 (MSA)

(iv) Antenna AS-177/UPX (MSA). Part of Aerial Outfit AMA
(v) Test Set AN/UPM-68 (MSA). (Type 954(2) only)

(b) British Items

(i) AP 64223 Cabinet Design 131
(ii) AP 64225 Cabinet Design 133) Part of Accessory Outfit FCC
RESTRICTED

PHYSICAL DATA

Office equipment Height 6 ft Width 22 in Depth 28 in Weight 630 lb

ASSOCIATED AERIAL OUTFIT

Aerial Outfit AMA (Antenna AS-177/UPX (MSA))

POWER REQUIREMENTS

115 V 60/60 Hz single phase 750 watts
115/220/230 V d.c. or a.c. 350 watts

These figures allow for fitting of future equipment.

HEAT DISSIPATION IN OFFICE

750 W approximately.

REMARKS

The main items of transponder equipment, although made in the United Kingdom, are of American design and have been supplied under the Mutual Defence Aid Programme. The cabinets for housing the office equipment have been designed in the United Kingdom.

HANDBOOK

BR 2134

ESTABLISHMENT LIST

E 1128

INSTALLATION SPECIFICATION

8832 Type 954(1) and (2) and Aerial Outfit AMA.
TYPES 954M(1) AND 954M(2)

SUMMARY OF DATA

PURPOSE


BRIEF DESCRIPTION

Types 954M(1) and (2) are shipborne transponders for replying to I.F.F. Mark 10 interrogators. Both sets employ the same items of transponder equipment, but Type 954M(2) includes Radar Test Set AN/UPM-68 (MSA) in addition and is fitted in cases where it is not possible to utilise the test set provided with I.F.F. Mark 10 interrogators Types 954M(1) or 954M(2). In the case of Type 954M(1) two items of S.I.F. equipment belonging to the interrogator are fitted in the cabinet for convenience.

The interrogations are received as pulse-pairs on a frequency of 1030 MHz. These interrogations are converted to video signals in the receiver-transmitter from whence they are passed to Coder-Decoder KY-88/UPX-5 which generates a single pulse for each correct interrogation. These pulses are led to the S.I.F. Coder, Transponder which generates a coded pulse train for each pulse fed in. The coded pulse trains are fed to the modulator of the transmitter, the output of which is fed to the antenna and radiated on 1090 MHz as replies to the interrogations. The equipment may be switched to basic operation if required, when the S.I.F. coding circuits will be by-passed and the antenna will radiate one pulse for each pulse-pair received.

FREQUENCY

1030 MHz Reception 1090 MHz Transmission.

POWER OUTPUT

300 W (peak) approximately.

PULSE REPETITION FREQUENCY

Up to 4000 pulses per second (depending on interrogation rate).

PULSE DURATION

0.5 μs (the transponder normally transmits a train of pulse.

INTERMEDIATE FREQUENCY

59.5 MHz

RECEIVER BANDWIDTH

8 MHz to 11 MHz at 6 dB down.

AERIAL BEAM WIDTH

Omni-directional.

HEAT DISSIPATION IN OFFICE

750 W approximately

ASSOCIATED AERIAL OUTFIT

AMA, comprising Antenna AS-177/UPX (MSA).
MAJOR UNITS

(a) Type 954W(1)

(i) Receiver-Transmitter RT-369/UPX-5 (MSA)
(ii) Coder-Decoder KY-88/UPX-5 (MSA) Mod. 1
(iii) Radar Set control C-107L/UPX-5 (MSA)
(iv) 5895-AP 164237 Cabinet, Transponder (Upper)
(v) AP 64225 Cabinet Design 131 (Mod. 1)
(vi) 5895-AP 164337 Coder, Transponder

NOTE: 1 Two items of Type 944W equipment, viz., Decoder, Passive and Decoder, Distress, are fitted in the Type 954W(1) transponder cabinets.

(b) Type 954W(2)

As in (a) above with the addition of Radar Test Set AN/UPM-6B (MSA) and with AP 64223 Cabinet Design 131 (Mod. 1) instead of 5895-AP 164237 cabinet.

NOTE: 2 The two items of Type 944W equipment referred to in Note 1 are not fitted in the Type 954W(2) cabinets.

PHYSICAL DATA

<table>
<thead>
<tr>
<th>Height</th>
<th>Width</th>
<th>Depth</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 ft</td>
<td>22 in</td>
<td>28 in</td>
<td>600 lb approximately</td>
</tr>
</tbody>
</table>

POWER REQUIREMENTS

<table>
<thead>
<tr>
<th>Type 954W(1)</th>
<th>Type 954W(2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>115 V, 50/60 Hz main supply</td>
<td>750 VA</td>
</tr>
<tr>
<td>115 or 220 V anti-condensation heater supply</td>
<td>210 W</td>
</tr>
</tbody>
</table>

REMARKS

The main items of transponder equipment are of American design, although manufactured in the United Kingdom under the Mutual Security Aid (M.S.A.) agreement. The cabinets and S.I.F. coder are of British design and manufacture.

HANDBOOK

BR 2329

ESTABLISHMENT LISTS

<table>
<thead>
<tr>
<th>Type 954W(1) and (2)</th>
<th>E1128</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outfit AMX</td>
<td>E1171</td>
</tr>
<tr>
<td>Outfit FFC</td>
<td>E1172</td>
</tr>
<tr>
<td>Outfit SNB</td>
<td>E1307</td>
</tr>
<tr>
<td>Test Set AN/UPM-6B (MSA)</td>
<td>AE25</td>
</tr>
</tbody>
</table>

INSTALLATION SPECIFICATION

BB32
PURPOSE

I.F.F. Mark 10 transponder for small craft and submarines.

BRIEF DESCRIPTION

Type 955 is the I.F.F. Mark 10 transponder fitted in small craft and submarines. The main unit is the Air Ministry Transmitter-Receiver TR 6061, this being controlled by Admiralty Pattern 71395 Control Unit Design 142 Transponder.

The interrogations are received as pulse pairs on a frequency of 1030 MHz. These are converted to video signals in the receiver, which generates a single pulse for each appropriate interrogation. This pulse is fed to the modulator which in turn excites the transmitter, the output of which is fed to the aerial and radiated on 1090 MHz as a reply to the interrogation.

FREQUENCY

1030 MHz Reception.
1090 MHz Transmission.

POWER OUTPUT

500 watts peak.

PULSE REPETITION FREQUENCY

Up to 2500 pulses per second (depending on interrogation).

PULSE LENGTH

0.5 microsecond.

RECEIVER BANDWIDTH

10–12 MHz at 6 dB below maximum.

MAJOR UNITS

TR 6061 Transmitter-Receiver
AP 71395 Control Unit Design 142 Transponder.

PHYSICAL DATA

<table>
<thead>
<tr>
<th></th>
<th>Height</th>
<th>Width</th>
<th>Depth</th>
<th>Depth</th>
</tr>
</thead>
<tbody>
<tr>
<td>TR 6061</td>
<td>9 in</td>
<td>9 ½ in</td>
<td>14 in</td>
<td>30 10</td>
</tr>
<tr>
<td>Control Unit</td>
<td>6 ½ in</td>
<td>4 in</td>
<td>4 ½ in</td>
<td>1 70</td>
</tr>
</tbody>
</table>

ASSOCIATED AERIAL OUTFIT

AMA in surface craft
AMJ in submarines

POWER REQUIREMENTS

115 V, 320–2600 Hz single phase a.c. 350 watts
24 V d.c. 150 watts. (This allows for additional equipment to be added later.)
HEAT DISSIPATION

110 watts. (Without additional equipment.)

HANDBOOK

BR 218 (AP 2887N Volume 1)

ESTABLISHMENT LIST

E 1214

INSTALLATION SPECIFICATION

0858
PURPOSE

I.F.F. Mark 10 transponder with Selective identification Feature (S.I.F.) for small craft and submarines.

BRIEF DESCRIPTION

The main units are of Ministry of Aviation design, with Admiralty pattern control unit, rack and connectors which enable the equipment to be used in ships. Type 955 is converted to Type 955M by the addition of S.I.F. Outfit SNC.

The interrogations are received as pulse pairs on a frequency of 1030 MHz. These are converted to single pulses in the receiver section of the transponder and fed to the coding unit, which generates a pulse train for each pulse fed in. The pulse trains, the composition of which is set by controls on the front of the coding unit and control unit 6945, are fed to the modulator of the transmitter section of the transponder. The transmitter output is fed to the aerial and radiated on 1090 MHz as replies to the interrogations.

The equipment may be converted to basic I.F.F. operation by inserting a 'Navy' function plug in the transmitter-receiver in place of the 'S.I.F.' function plug which is used for S.I.F. operation. In this condition the S.I.F. coding circuits are bypassed and the aerial will radiate one pulse for each pulse pair received.

FREQUENCY

1030 MHz reception. 1090 MHz transmission.

POWER OUTFIT

500 watts peak

PULSE REPETITION FREQUENCY

Up to 2500 pulses per second (depending on interrogation).

PULSE DURATION

0.5 microsecond (the transponder normally transmits a train of pulses).

RECEIVER BANDWIDTH

10-12 MHz at 6 dB below maximum.
MAJOR UNITS

Transmitter-Receiver TR 6061.
AP 71395 Control Unit Design 142 Transponder.
Coding Unit 6466, with Control Unit 6465 (Part of S.I.F. Outfit SNC).

ASSOCIATED AERIAL OUTFIT

AMA in surface craft, AMJ or AMK in submarines.

PHYSICAL DATA

<table>
<thead>
<tr>
<th></th>
<th>Height</th>
<th>Width</th>
<th>Depth</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>TR 6061</td>
<td>9½ in</td>
<td>9½ in</td>
<td>14 in</td>
<td>30 lb</td>
</tr>
<tr>
<td>Control Unit AP 71395</td>
<td>6½ in</td>
<td>4 in</td>
<td>4½ in</td>
<td>1 lb</td>
</tr>
<tr>
<td>Coding Unit 6466 and Control Unit 6465 in rack</td>
<td>12½ in</td>
<td>6½ in</td>
<td>10 3/16 in</td>
<td>14 lb</td>
</tr>
</tbody>
</table>

POWER REQUIREMENTS

115 V, 400 Hz single phase a.c. 140 watts. 24 V d.c. 53 watts.

HEAT DISSIPATION

190 watts

HANDBOOKS

Type 955/M
Aerial Outfit AMA
Aerial Outfit AMJ
Aerial Outfit AMK

BR 2188 (AP 2887N Volumes 1 and 2).
NAVSHIPS 91597 (MSA) Instruction Book for Antenna Assembly AS-177/UPX(MSA)
Summary of Data for Confidential Radio Equipment.

ESTABLISHMENT LISTS

Type 955/M
S.I.F. Outfit SNC
Aerial Outfit AMA

E1214
E1322
E4171

INSTALLATION SPECIFICATION

BB53
PURPOSE

A short range, approximately 200 miles tactical and general navigation system for aircraft providing, in the aircraft, continuous range and bearing information of the beacon.

BRIEF DESCRIPTION

The system provides continuous meter indication in the aircraft of the bearing of the transmitting beacon, to any number of aircraft, together with aural identification of the particular beacon being received.

Range is obtained in the aircraft by a distance measuring system in which a Tacan transmitter sends a correctly coded pulse, the time delay of the response being used to indicate the distance in miles from the beacon. The beacon can provide this information for up to 100 aircraft.

TYPE OF TRANSMISSION

Pulse coding, pulse duration 3.5 ± 0.5 μs.
Peak Power 5 kW, Pulse pairs spaced 12 μs ± 0.5 μs.

FREQUENCY RANGE

Transmit 962 to 1024 MHz (Low Band)
1152 to 1223 MHz (High Band)
Receive 1025 to 1110 MHz.
There are 126 channels available.

AERIAL SYSTEM

Aerial Outfit AMG.

This consists of a central array which produces the required vertical radiation pattern, and two rotating cylinders (900 r.p.m.) carrying the parasitic elements which give 13 Hz and 125 Hz sine wave modulation, used in connection with bearing information.
MAJOR UNITS

<table>
<thead>
<tr>
<th>NSN</th>
<th>Description</th>
<th>Height</th>
<th>Diameter</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>5825-99-932-5351</td>
<td>Aerial Assembly (High Band)</td>
<td>69% in</td>
<td>43% in</td>
<td>425 lb</td>
</tr>
<tr>
<td>5825-99-932-5318</td>
<td>Aerial Assembly (Low Band)</td>
<td>77% in</td>
<td>43% in</td>
<td>425 lb</td>
</tr>
<tr>
<td>5825-99-932-5319</td>
<td>Aerial Control Cabinet</td>
<td>76% in</td>
<td>24% in</td>
<td>18% in</td>
</tr>
<tr>
<td>5825-99-932-5356</td>
<td>Electronic Cabinets</td>
<td>77% in</td>
<td>66% in</td>
<td>29% in</td>
</tr>
<tr>
<td>5825-99-932-5359</td>
<td>Air Conditioner</td>
<td>65% in</td>
<td>24% in</td>
<td>24% in</td>
</tr>
<tr>
<td>AP 63150</td>
<td>Monitor R.F.</td>
<td>36% in</td>
<td>24% in</td>
<td>16% in</td>
</tr>
</tbody>
</table>

POWER REQUIREMENTS

400/416/440 V 3 phase 45/65 Hz
8 kVA approximately, including aerial motor supplies.

HANDBOOKS

AP 2534L BR 2135

ESTABLISHMENT LIST

E 1225

INSTALLATION SPECIFICATION

BB83

RESTRICTED
PURPOSE

Aircraft warning radar

BRIEF DESCRIPTION

Type 960 is a long range warning radar which is normally fitted in association with certain other radar sets such as Types 277/F, 293/F, 872, 983, 992 and L.F.F. to form an integrated warning system. In most cases all the sets in a combination are powered from a common supply system, and transmissions are synchronised by pulses from a master trigger unit. Anti-jamming circuits are incorporated, and remote control of switching for these circuits is provided, usually in the R.D.R. All operational information from Type 960 and associated sets is available from displays in the operations room and R.D.R. A display panel is also fitted in the 960 office for setting up purposes.

FREQUENCY

Spot frequencies within the band 80 to 90 MHz.

POWER OUTPUT

450 kW approximately

PULSE REPETITION FREQUENCY

250 pulses per second.

PULSE DURATION

5 or 15 microseconds.

INTERMEDIATE FREQUENCY

8 MHz

RECEIVER BANDWIDTH

(a) 65 kHz for long pulse (15 µs)
(b) 500 kHz for short pulse (5 µs)
MAJOR UNITS

(a) Transmitter and Modulator (panel 3 BT)
1. AP 5871A Panel 3 BT Oscillating
2. AP 5872A Panel 3 BT Amplifying
3. AP 5873A Panel 3 BT Output
4. AP 5874A Panel 3 BT Supply Filtering
5. AP 5875A Panel 3 BT Modulating Left
6. AP 5876A Panel 3 BT Modulating Right

(b) Panel L54 Receiving AP 5878A

RU1 AP 58782 Amplifier Unit I.F. Des. 8 (Narrow Band)
RU2 AP 58783 Amplifier Unit I.F. Des. 9 (Wide Band)
RU3 AP 58784 Filter Unit Video Des. 16
RU4 AP 58785 Rectifier Unit Des. 200
RU5 AP 58786 Rectifier Unit Des. 101
RU6 AP 58787A Range Calibrator Des. 3
RU7 AP 58788 Performance Meter Des. 6
RU8 AP 58789 Amplifier Unit A.F. Des. 8
RU9 AP 58790 Auto Frequency Control Unit
RU10 AP 58791 Rectifier Unit Des. 102
RU11 AP 58792 Rectifier Unit Des. 103
RU12 AP 58793 Amplifier Unit Power Video
RU13 AP 58794 Cathode Follower Unit Des. 13
RU14 AP 58795 Rectifier Unit Des. 109
RU15 AP 58786 Switch Unit Des. 31
RU16 AP 58797 Switch Unit Des. 32
RU17 AP 58798 Switch Unit Des. 33
RU18 — Main Frame

(c) Miscellaneous
1. AP 63679C Filter Unit Des. 64
2. AP 6286A Meter Unit Des. 21
3. 5320—AP 172399 Automatic Protection Unit
4. AP 58670 Control Unit Des. 45 (Local Frequency)
5. AP 58785A Board, Watchkeeping, Des. 2 (a.c. ships)
6. AP 58680 Board 2AR Distributing Des. 1
   or
   AP 58669 Board Distributing Des. 8
7. AP 58780 Switch Unit Local/Remote
   or
   AP 58664 Rack, Stowage Des. 13
   (for spares)

ASSOCIATED AERIAL OUTFIT

AQQ(2) or AQQ(3)

ASSOCIATED DISPLAY OUTFITS

JL/JM series

ASSOCIATED I.F.F. SETS

Type 944M(1) Interrogator, Type 954M(1) or Type 954M(2) Transponder

PHYSICAL DATA

Weight of office equipment (including local display panel, aerial control unit and power distribution board) is 3 tons approximately. Dimensions of typical office are 14 ft. in long, 11 ft. wide, 7 ft. high.

POWER SUPPLIES

(a) D.C. Ships

220 V d.c. 10.25 kw 24 V d.c. 200 W
230 V 50 Hz 3 phase 2.25 kVA 50 V 50 Hz single phase 200 VA
120—360 V 7.50 Hz single phase 9 kVA
180 V 500 Hz single phase 3.5 kVA

(b) A.C. Ships

440 V 60 Hz 3 phase 10.75 kVA
220 V d.c. 200 W 24 V d.c. 200 W
230 V 60 Hz 3 phase 2.45 kVA
60 V 60 Hz single phase 200 VA
120—360 V and 180 V as for D.C. Ships

HEAT DISSIPATION IN OFFICE

7 kw approximately

HANDBOOK

BR 1181(1) and (2)

ESTABLISHMENT LIST

E 850

INSTALLATION SPECIFICATION

9640
TYPE 963 TRANSMITTER AND RECEIVER

SUMMARY OF DATA

PURPOSE

The transmitter and receiver, with aerial outfit AKN and associated equipments, form part of the Carrier Controlled Approach system. This is a 3 cm radar system used for aircraft carrier landing operations.

FREQUENCY

9350 to 9800 MHz

POWER OUTPUT

200 kw peak (nominal)

PULSE REPETITION FREQUENCY

Free running : 200 p/s
(10% - 20%)
Externally-triggered : 400 - 2000 p/s

V.S.W.R.

Not less than 0.67 over the frequency band.

PULSE LENGTH

0.5 microsecond +0% -20%

BEAM WIDTH

Horizontal (to half power) 1° ± 0.2
Vertical (to half power) 1.65° - 1.85°
Elevation angle of beam axis 3.5° but adjustable by 1° around between 2° and 4°.

RECEIVER SENSITIVITY

9 kWatts peak pulse r.f. input to receiver gives 1 volt peak pulse video output into 70 ohms.

RECEIVER NOISE FACTOR

16 dB

"The 3 dB bandwidth is 5 MHz ± 1 MHz

INTERMEDIATE FREQUENCY

30 MHz ± 1 MHz

MAJOR UNITS

The following table lists the major units in or associated with the transmitter and receiver assemblies:

<table>
<thead>
<tr>
<th>UNIT</th>
<th>AP No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. CABINET ASSEMBLY, DESIGN 78, TRANSMITTER</td>
<td>62300</td>
</tr>
<tr>
<td>Consisting of:</td>
<td></td>
</tr>
<tr>
<td>Cabinet, Design 103, Transmitter</td>
<td>62301</td>
</tr>
<tr>
<td>Sub-Modulator Chassis</td>
<td>62304</td>
</tr>
<tr>
<td>Control Unit, Design 99, Transmitter</td>
<td>62307</td>
</tr>
<tr>
<td>Rectifier Chassis, 63CP, Alarm</td>
<td></td>
</tr>
<tr>
<td>2. The following are associated with AP 62300, and are first-fitting items:</td>
<td></td>
</tr>
<tr>
<td>Transmitter Chassis, 69C</td>
<td>62306</td>
</tr>
<tr>
<td>Rectifier Chassis, 63CA, Transmitter</td>
<td></td>
</tr>
</tbody>
</table>

RESTRICTED
RESTRICTED

UNIT | AP NO.
---|---
3. CABINET ASSEMBLY, DESIGN 79, RECEIVER consisting of:
   - Cabinet, Design 102, Receiver
   - Receiver Drawer, 62L
   - Waveguide Milled Block, Size 16
   - Head-Amplifier Unit
   - Amplifier Unit, I.F., 45 W
   - Amplifier Unit, Video, 47J
   - A.F.C. Unit, Design 9
   - Wavemonitor Chassis, Design 2
   - Rectifier Chassis, 63CB, Receiver
   | 62310
   | 62311
   | 62312
   | 62313
   | 62314
   | 62315
   | 62316
   | 62317
   | 62318
   | 62319
   | 62320
   | 62321
   | 62322
   | 62323
   | 62324
   | 62325
   | 62326

4. ANCILLARY EQUIPMENT, consisting of:
   - Switch, Waveguide, Design 3, Changeover
   - Dummy Load, Design 20
   - Switch, Sync and Video, Changeover
   - Switch Unit, Design 88, Blind Rect
   - Phase Changer
   - Resistance Panel, Alarm
   - Wavemonitor Unit, Design 4
   | 62666
   | 62674
   | 62667
   | 62668
   | 62675
   | 64748
   | 64641

5. RECEIVER TEST CABINET consisting of:
   - Cabinet, Design 102, Receiver
   - Receiver Drawer, 62L
   - Receiver Chassis, 63CB, Receiver
   - Head Amplifier Unit
   - Amplifier Unit, I.F., 45 W
   - Amplifier Unit, Video, 47J
   - A.F.C. Unit, Design 9
   - Base, Mounting, Aluminium
   - Wavemonitor Chassis, Design 2
   | 62311
   | 62312
   | 62313
   | 62314
   | 62315
   | 62316
   | 62317
   | 62318
   | 62319
   | 62320
   | 62321
   | 62322
   | 62323
   | 62324
   | 62325
   | 62326
   | 62327
   | 62328

WEIGHT OF MAJOR ASSEMBLIES

CABINET ASSEMBLY, DESIGN 78, TRANSMITTER, AP 62300, plus Transmitter Chassis, 69C, AP 62305, and Rectifier Chassis, 63CA, Transmitter, AP 62306

<table>
<thead>
<tr>
<th>Weight</th>
<th>lb</th>
</tr>
</thead>
<tbody>
<tr>
<td>540</td>
<td>1</td>
</tr>
<tr>
<td>120</td>
<td>1</td>
</tr>
</tbody>
</table>

POWER REQUIREMENTS AND CONSUMPTION

REQUIREMENTS

200 V, 400/500 Hz: filaments, h.t. and e.h.t. transformers, and blowers, if 200 V blowers are incorporated.

500 V d.c.: control unit for transmitter switching relays and warning lights.

220 V d.c.: anti-condensation heaters in d.c. ships.

440 V, 60 Hz, single-phase: anti-condensation heaters in a.c. ships.

CONSUMPTION

200 V, 400/500 Hz: transmitter, 1250 VA

220 V d.c.: transmitter, 100 W

440 V, 60 Hz, single-phase: receiver, 30 W

AERIAL SYSTEM

Aerial Outfit AKN

HANDBOOK

BR 1557

ESTABLISHMENT LIST

E 1138

INSTALLATION SPECIFICATION

B 840

RESTRICTED
TYPE 965M/P

SUMMARY OF DATA

PURPOSE

Small Ships Aircraft Warning.

BRIEF DESCRIPTION

Type 965M/P is a long range aircraft warning radar designed primarily to be fitted in destroyers and frigates. A common aerial is used for the transmitter and receiver. These two items together with the office display unit (Monitor Unit Set No. 44) are situated below decks. Up to six remote P.F.I. displays may be fed with the present arrangement of cathode followers. Type 965M/P is also integrated with I.F.F. Mk. 10.

FREQUENCY

216-224 MHz

WAVELENGTH

1.4 metres (approx.).

POWER OUTPUT

450 kW

PULSE REPETITION FREQUENCY

200 or 400 p/s (nominally).

INTERMEDIATE FREQUENCY

13.5 MHz

ASSOCIATED AERIAL OUTFIT

Aerial Outfit AKE(1) for 965M.
Aerial Outfit AKE(2) for 965P.

PULSE LENGTH

3.8 µs and 10 µs

AERIAL BEAM WIDTH

Horizontal = 120°
Vertical = 40° (approx.)

AERIAL ROTATION SPEED

10 r.p.m.

RECEIVER BANDWIDTH

Long Pulse 120 kHz
Short Pulse 330 kHz
MAJOR UNITS

AP 172020  Cabinet Design 221
AP 173026  Cabinet Modulator
AP 173027  Cabinet Oscillator
AP 173028  Door Assembly Oscillator
AP 201036  Filter Unit R.F.
AP 173117  Duplexer
AP 173115  Cabinet (Upper)
AP 172036A Monitor Unit Design 85 R.F.
AP 173100  Power Supplies Stabilised
AP 173116  Cabinet (Lower)
AP 173039  Receiver Radar
AP 173037  Amplifier Video

PHYSICAL DATA

Cabinets Design 221, Modulator and Oscillator, with weight (loaded) - 3300 lb.
Cabinets (Upper) and (Lower) Weight (loaded) - 600 lb.
Dimensions - 72 in high 22" in wide, 25 in deep.

POWER REQUIREMENTS

230 V 50/60 Hz 3 phase wire 6 kVA or
400 V 50/60 Hz 3 phase 4 wire.
220 V d.c. 1-2 kw or 115 V a.c. (anti-condensation heaters).

HANDBOOKS

BR 2317(1)(2A)(2B) Type 965M/P
BR 1186 Aerial Outfit AKE(1)
BR 23A2 aerial Outfit AKE(2)

ESTABLISHMENT LISTS

E 1295 (965M/P), E 1230 Aerial Outfit AKE(1) and AKE(2).

INSTALLATION SPECIFICATION

BB47 (965M/P)
BB99 (AKE(1))
BB12 (AKE(2))