

CHAPTER 1

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INTRODUCTION

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GENERAL

- 1 This technical manual covers the low speed transceiver and turning mechanism CAE-A30/7 and the high speed transceiver and turning mechanism CAE-A30/8. For information on earlier versions of the equipment refer to Publication KH 1203.
- 2 The transceiver may be interfaced with any of the Nucleus 2 and 3 Series displays via a parallel interface or the NUCLEUS 3 series displays only via a Controller Access Network (CAN) Bus link, the CANbus link being interfaced to the transceiver via a Transmitter Interface Unit (TIU). When the parallel interface is used the Low Speed Turning Mechanism (CAE-A30/7) uses +27V power supply from the display unit to drive the turning motor, whereas the High Speed Turning Mechanism (CAE-A30/8) uses an external 40V Power Supply Unit which is bulkhead mounted below deck. When the CANbus interface is used, the power supplies are provided by the Transmitter Interface Unit for both low and high speed turning mechanisms (the voltage can be set to meet the requirement of the specific turning mechanism).
- 3 Forward planning for positioning the various units of the Radar must be made before any installation work is carried out. A full survey is required in order to establish the ship's fitment. This may be arranged with the Technical Department of Kelvin Hughes or one of the approved Agencies. Details of Agencies worldwide can be found in Publication KH 401. Kelvin Hughes, or appointed agents, contract to supply and install the equipment. It is recommended that the installation is made by a fully qualified Kelvin Hughes Radar Engineer.

Compass Safe Distances

- 4 Compass safe distances are stated on labels on all units and are as follows:

	Grade I (0.25 degree)	Grade II (1 degree)
MkV Transceiver	3.0m	1.8m

Transceiver Unit Siting

- 5 The Transceiver is to be mounted on a rigid platform, which is positioned so that the rotating antenna is clear of other structures.
- 6 The Transceiver/Antenna assembly should be installed in a position that eliminates or minimises blind arcs caused by obstructions, e.g. masts, etc.
- 7 The primary consideration must be the strength of the support for the Transceiver/Antenna assembly. Details of this requirement are described in the following sub-paragraphs :
 - (1) The antenna must be mounted more than 3ft (914mm) above any flat surface greater than the diameter swept by the antenna. It must not be positioned in close proximity of any magnetic compass or D/F aerial etc.

- (2) Masts, sampsons, posts and rigging of more than 0.6m (2ft) diameter can cause blind sectors. Increasing the distance between the antenna unit and these objects will reduce the blind sectors that inhibit a good radar picture. Funnels, crosstrees and other large areas can reflect energy and give rise to spurious echo returns especially in close proximity to land. Positioning the antenna close to funnels and exhaust gasses can adversely affect antenna performance. The antenna units must not be mounted where the temperature exceeds 70 C.
- (3) Antennas must be kept clear of ships radio and communication aerials to avoid electrical RF interference that will cause reflections on the radar PPI display.

NOTE: *A heavy duty earthing strap or cable must be taken from the scanner unit to the ship's earth.*

- 8 The Antenna is to be mounted onto the Transceiver/Gearbox using the 'O' ring and fixings supplied. Dimensions and weights for the unit are given in Chapter 2.

Power Supply Unit Siting

- 9 The Power Supply Unit (CZZ-A22) is only required for the High Speed Turning Mechanism (CAE-A30/8). It is bulkhead mounted in a protected environment and is secured by four fixings.

SYSTEM DESCRIPTION

- 10 The MkV Transceiver (CAE-A30/7 and CAE-A30/8) comprises the following main units:
 - (1) Terminals PCB.
 - (2) Modulator.
 - (3) Magnetron/RF Head.
 - (4) Azimuth PCB.
 - (5) Receiver.
 - (6) Tx Monitor (Optional).
 - (7) Brushless Motor PCB (CAE-A30/8 only).
- 11 The 40V Power Supply (CZZ-A22), used on the High Speed Turning Mechanism (CAE-A30/8) only, is a separate item of equipment, which is mounted below decks. This is only required when the parallel interface is used. When the CANbus interface is used the TIU supplies either +26V (low speed turning mechanism) or +36V (high speed turning mechanism) for the antenna turning motor, selected by a switch on the power supply.

Terminals PCB

12 The Terminals PCB feeds the incoming power and data from the display to the other assemblies, providing modulator trigger pulses, pulse selection gating, antenna switching, voltage regulation and tune voltage. The PCB also receives the video from the Receiver and feeds the signals to the display processor.

Modulator

13 The Modulator provides a high voltage pulsed supply via a pulse width circuit and FET circuit into a pulse transformer to drive the Magnetron.

RF Head

14 The RF Head contains the Magnetron, Ferrite Circulator, Pulse Limiter and Low Noise Front End (LNFE). The LNFE comprises an RF Amplifier, Local Oscillator and IF Head Amplifier.

15 The magnetron energy is fed to the circulator and via the rotating joint to the antenna. The small leakage of power across the circulator, is fed into the pulse limiter and used by the LNFE as a tune signal.

16 Return signals from the antenna are fed through the circulator to the limiter and the LNFE, where they are amplified, mixed and converted to IF levels to interface with the Receiver main IF.

Receiver

17 The Receiver amplifies and filters the IF from the RF Head and then feeds the signal to an eight stage logarithmic amplifier which produces the video for the display monitor.

Azimuth PCB

18 The Heading Line and Azimuth data are produced by the interaction between an opto-interrupter disc and sensors located on the PCB.

Brushless Motor PCB (CAE-A30/8 only)

19 The Brushless Motor PCB provides switching of the 40V supply to drive the motor within the transceiver/turning mechanism at a constant speed.

+26V Motor Start PCB

20 Provides switching of +26V supply to drive the low speed motor. LK1 is made for CAE-A30-7.

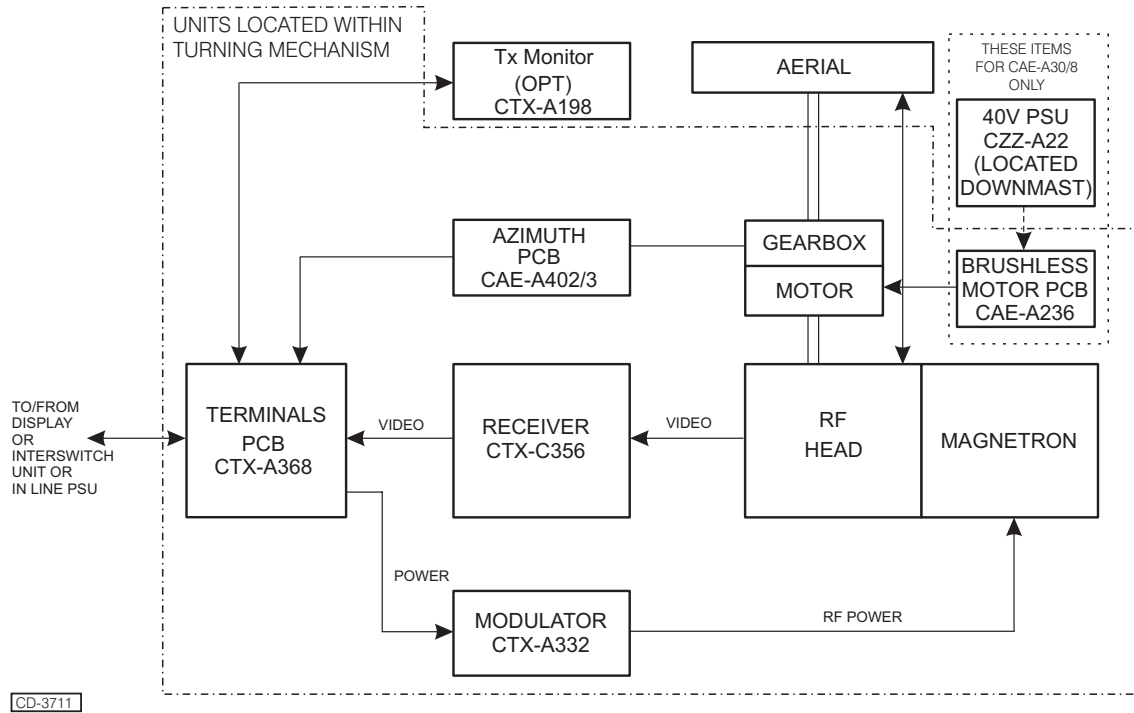


Figure 1 - System Block Diagram

40V Power Supply

21 The 40V Power Supply (CAE-A30-8 only) is bulkhead mounted below decks and is connected the Transceiver by a cable. The unit consists of a +40V power supply with associated control, filter and indicator circuits. A switch mounted on the top panel of the unit allows the power supply to be switched off. The 40V Power Supply is connected to the Transceiver/Turning Mechanism via the Display, Interswitch Unit or In Line Power Supply.