

CHAPTER 8

FREQUENCY STANDARD

CONTENTS

<u>Para</u>		<u>Page</u>
1.	INTRODUCTION	8-1
2.	FREQUENCY STANDARD TYPE 9442	8-1
3.	FREQUENCY STANDARD TYPE 9420	8-1
4.	REPAIR	8-3

	<u>Tables</u>	<u>Page</u>
Table 1 :	Frequency Standard Specification	8-2
Table 2 :	9442 Pin Connections	8-2
Table 3 :	9420 Pin Connections	8-3

CHAPTER 8

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INTRODUCTION

1. One of two types of 5 MHz frequency standard may be fitted to the receiver (dependent upon the degree of frequency stability required) as an option. The two types of frequency standard are described below. Note that either type may be retrospectively fitted to a receiver by ordering the appropriate kit of parts (ST 81218 for the 9420 kit, ST 81219 for the 9442 kit).

FREQUENCY STANDARD TYPE 9442

2. The Racal 9442 frequency standard is a fast warm-up crystal oscillator of small physical size which provides a high degree of accuracy and long term stability with low power consumption (table 1). The crystal is housed in a temperature controlled oven which, together with the maintaining circuit and a buffer amplifier, is fitted in a metal can with polyurethane foam to provide heat insulation. Access may be gained to the internal trimmer capacitor after removal of a small rubber plug. Adjustment procedures are given in Chapter 20. Connections are made via a B7G base, with pin connections as given in table 2.

FREQUENCY STANDARD TYPE 9420

3. The Racal 9420 frequency standard is a compact crystal oscillator similar in construction to the 9442. It contains a high-quality crystal which is operated in the third overtone mode. Like the 9442, the metal can contains polyurethane heat for best insulation and a removeable rubber plug allows access to the internal multi-turn trimmer capacitor. For finer adjustment, a potentiometer is fitted to the 20 MHz reference board which sets the voltage applied to an internal varactor diode. Adjustment instructions are given in Chapter 20. Pin connections are given in table 3.

Table 1: Frequency Standard Specifications

	UNITS	9442	9420
Frequency	MHz	5	5
Daily Ageing Rate on Delivery		1×10^{-8}	2×10^{-9}
Daily Ageing Rate after 3 months		3×10^{-9}	5×10^{-10}
Short Term Stability over 1 Second		5×10^{-10}	1×10^{-10}
Warm-up time for 1×10^{-7} accuracy	Minutes	4	20
Retrace Characteristics		4×10^{-8} in 24 hours	2×10^{-8} in 24 hours
Temperature Operating Range	$^{\circ}\text{C}$	-10 to +60	-10 to +60
Stability with Temperature Change	Per $^{\circ}\text{C}$	3×10^{-9}	6×10^{-10}
Stability with supply voltage change	For 10% change	4×10^{-8}	5×10^{-9}
Minimum Output Level	mV r.m.s.	250 into 50 Ω	250 into 50 Ω
Trim Range		-6 +3 parts in 10^6	-8 +2 parts in 10^7
Supply Voltage	V	12	12
Typical Supply Current at 25 $^{\circ}\text{C}$	mA	60	120
Size	cm in	5 x 5 x 5 2 x 2 x 2	5 x 5 x 9.5 2 x 2 x 3.75
Base		B7G	B7G

Table 2 : 9442 Pin Connections

- 1 5 MHz output relative to pin 7
- 2 Not used
- 3 Not used
- 4 +12 V supply
- 5 Not used
- 6 Not used
- 7 0V (also connected to can.)

REPAIR

4. If the specified performance of either type of frequency standard cannot be obtained, users are advised to return the faulty module to Racal Communications Limited for servicing, since select-on-test components and precise assembly techniques are employed to ensure the specified performance.

Table 3 : 9420 Pin Connections

1	5 MHz Output relative to pin 7
2	Internally stabilized +5.6 V varactor diode control voltage
3	+7.5 V stabilized monitor output
4	+12 V supply
5	Internally stabilized +2.8 V output
6	Varactor diode connection
7	0 V (also connected to can).