CHAPTER 9

EXTENDED (AUDIO) CONTROL UNIT (ECU)

Contents

Illustrations

INTRODUCTION

1. The ECU is incorporated into the Transceiver system to provide the following facilities:

   (a) Control from a remote station.
   (b) Intercommunication between the LOCAL and the REMOTE stations.
   (c) Local and Remote station alert from the ECU and Transceiver units respectively.

SPECIFICATION

2. The specification is as follows:

Dimensions	:	167mm x 90mm x 166mm
Weight	:	1,6kg
Environment		
Temperature	:	-10° C to $+55^{\circ}$C
Input Voltage	:	10V to 16V (positive or negative)
Loop Resistance (Maximum)	:	100 ohms
Standby		
Audio Input	:	greater than 7V r.m.s. for 1W at L/S
Operate		
Receive		
Frequency Range	:	100Hz to 5kHz
Frequency Response	:	–3dB relative to 1kHz
Audio Output	:	1W minimum to L/S
(Input 1kHz, 12V p.d. L/S		
Gain at maximum)	:	2mW minimum to PHONES
Transmit		
Frequency Range	:	100Hz to 5kHz
Frequency Response	:	–3dB relative to 1kHz
Microphone Input	:	10mV p.d. transformed to 5mV p.d. minimum into 300 ohms at 1kHz.

FRONT PANEL CONTROLS

3. The following front panel controls are fitted:

STANDBY/OPERATE (SA)

(a) Standby
The ECU is switched to STANDBY when the Transceiver is controlled locally. The remote operator is then alerted when the Transceiver CALL mode is selected.

(b) Operate
OPERATE is selected whe the intercom or remote control facilities are required. The mode used is then selected at the Transceiver MODE switch.

L/S GAIN (RV1)

This potentiometer is adjusted to set the loudspeaker and headphone audio levels.

INTERCONNECTIONS

4. Interconnections from the ECU to the Transceiver and to the remote operators HMT are as follows:

(a) To Transceiver
The Transceiver is connected to the ECU by a twisted-pair 600 ohm telephone line wired to two terminals (TS1, TS2) located on the rear panel. This telephone line should not exceed 1,5km in length or have a total loop resistance greater than 100 ohms.

(b) To HMT
The HMT is connected to the ECU at SKT1. This socket may be either a 7-pin or 8-pin connector. The pins used in each instance are as follows:

	7-pin	8-pin
MIC	pin 1	pin A
PHONES	pin 2	pin D
COMMON	pin 3	pin C
PTT	pin 4	pin B

FUNCTIONAL DESCRIPTION

5. This description is given in terms of the OPERATE and STANDBY modes as selected at SA.

OPERATE

6. Transformer T1 primary circuits are connected to the Reciter audio transformer via the telephone line. This circuit in addition to carrying audio signals applies +12V d.c. to the ECU at terminal TS1. Consequently when the HMT PTT switch is operated, SKT1/4 is connected to SKT1/3 and relay RLA is energised.

7. Let us now consider the operation of the ECU in the receive conditon, i.e. the PTT switch is open and RLA is de-energised.

8. Audio signals generated int he Transceiver and applied to the ECU are connected from T1 secondary circuits to the loudspeaker and headphones via relay contact RLA-1, RV1 and SA. The sources of these signals, dependant upon the Transceiver mode selected, are as follows:

LOCAL – the Transceiver receiver circuits
INTERCOM – the Transceiver intercom handset.
REMOTE – the Transceiver receiver circuits

9. To transmit the ECU operator depresses this HMT PTT switch and RLA is energised. At the same time a transistor switch is activated in the Reciter intercom circuits to energise RLA located on the Intercom PCB.

10. In the ECU relay contact RLA-1 is opened to disconnect the loudspeaker and the headset from T1. Relay contact RLA-2 is closed and the MIC input is connected to T1. Once again the application in which these audio signals are used is controlled at the Reciter through the setting of the MODE switch. These are:

LOCAL – the remote audio signals are not used in this mode but when the remote p.t.t. is closed the Transceiver 'bleep-tone' generator is activated to alert the operator.
INTERCOM – transceiver local headphones and loudspeaker.
REMOTE – in addition to application to the local headphones and loudspeaker the ECU audio signals are applied to the input of the transmitter.

STANDBY

11. The remote unit loudspeaker and headset are connected to T1 via zener diodes D1 and D2 and audio signals are not normally received. If however the CALL mode is selected the intercom audio amplifier is caused to oscillate at a nominal 1kHz. The resulting signals in T1 secondary overcome D1 and D2 bias and a 1kHz audio 'call' signal is generated inthe ECU loudspeaker and remote headset.

PARTS LIST

12. The component tolerances and ratings given in this parts list are optimum. However if such components are not immediately available alternatives with closer tolerances and/or higher wattage or voltage ratings may be used in manufacture or supplied as replacements.

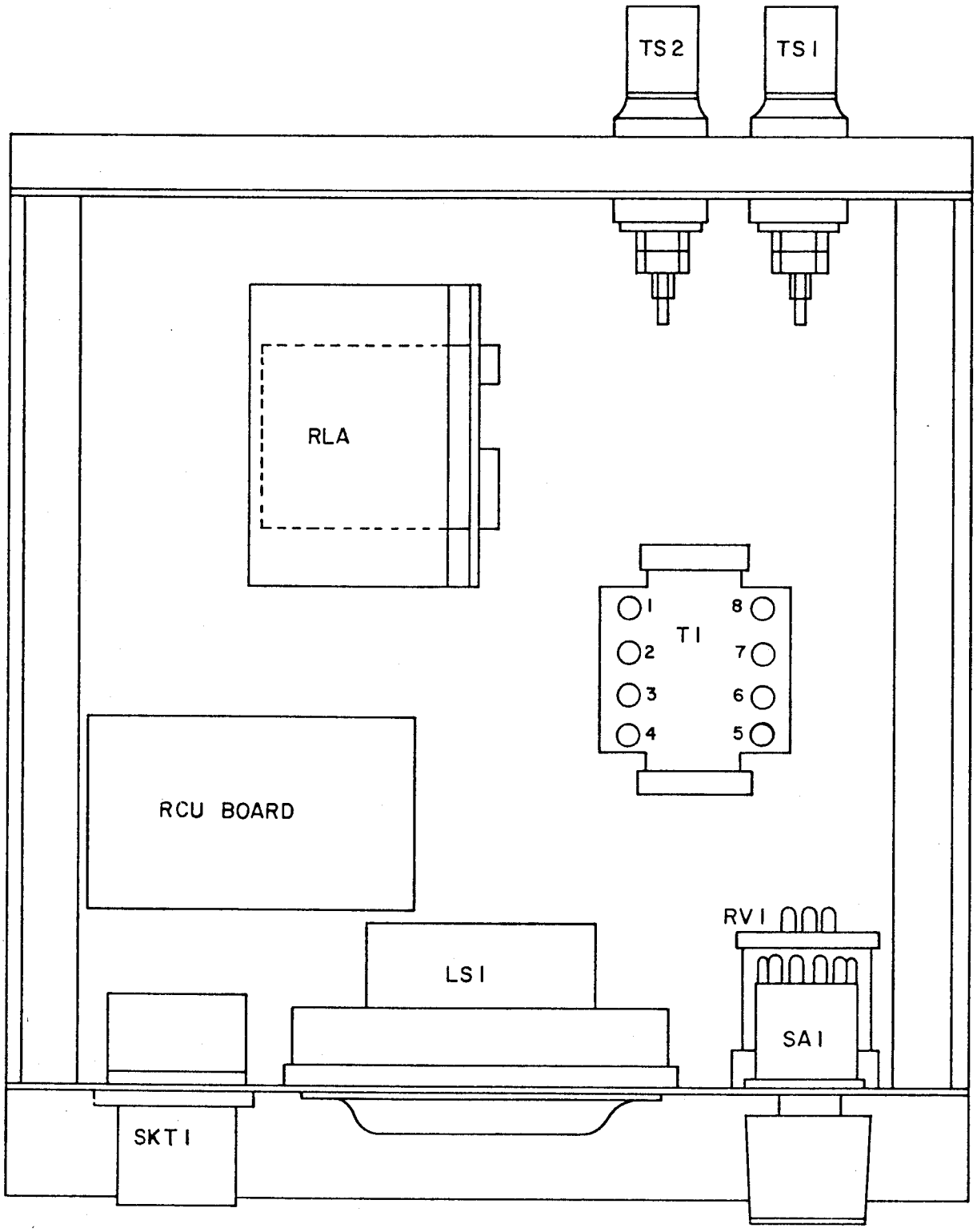
13. When ordering replacements please quote the full description including the circuit reference and the Order No.

EXTENDED (AUDIO) CONTROL UNIT (ECU).

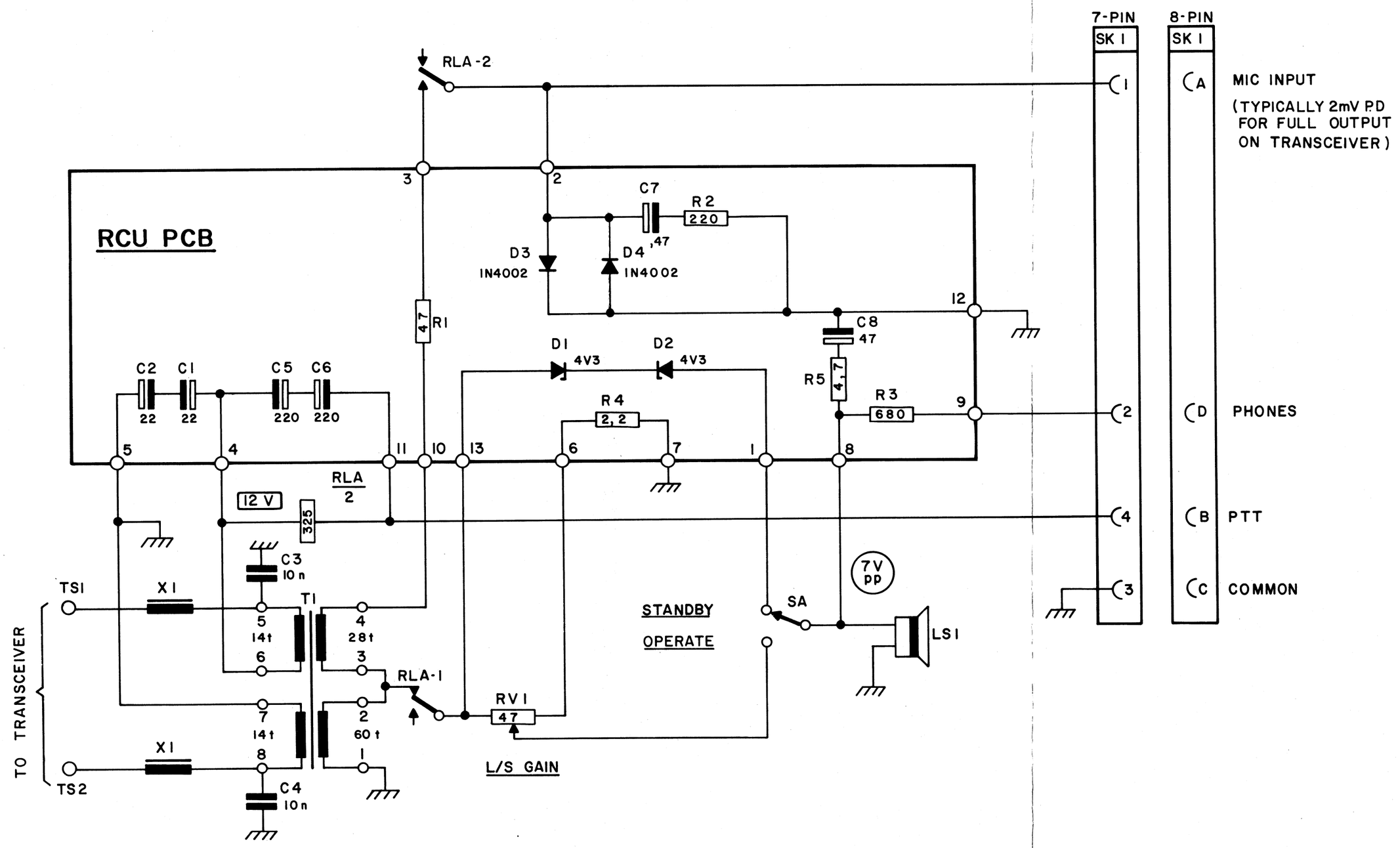
FIG. NO.	REF.	ORDER NO.	CODIFICATION	ITEM	DESCRIPTION	NO/UNIT
1		11-085-6		UNIT	EXTENDED (AUDIO) CONTROL	
				Sub-Assembly		
		13-016-9		PCB	ECU	
		11-060-0		Handset	With Plug	
				Capacitors		
	C3	26-310-4			Ceramic 100nF 50V	
	C4	26-310-4			Ceramic 100nF 50V	
				Connector		
	SK1	33-018-1			7-pin	
		33-086-5			8-pin	
	TS1	16-662-6			Screw Terminal	
	TS2	16-662-6			Screw Terminal	
				Louspeaker		
	LS1	35-058-5			6 ohms	
				Relay		
	RLA	34-001-0			2P C/o Siemens Type No. V23154 – D0719 – B110	
				Resistor		
	RV1	22-003-5			Wirewound 47 ohms 10p.c. 3W	
				Switch		
	SA	32-080-3			Rotary, 1p 2W	
				Toroid		
	X1					

ECU PCB

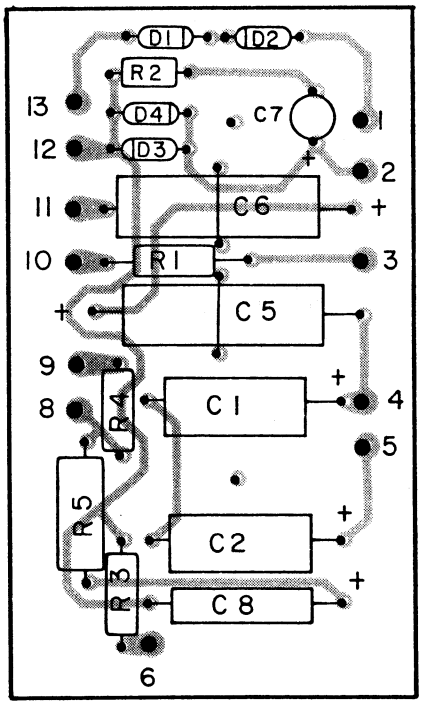
FIG. NO.	REF.	ORDER NO.	CODIFICATION	ITEM	DESCRIPTION	NO/UNIT
3		13-016-9		PCB	ECU	
				Capacitors		
	C1	24-130-4			Electrolytic 22uF 25V	
	C2	24-130-6			Electrolytic 22uF 25V	
	C5	24-240-4			Electrolytic 220uF 25V	
	C6	24-240-4			Electrolytic 220uF 25V	
	C7	25-080-2			Tantalum 470nF 35V	
	C8	24-181-3			Electrolytic 47uF −10 +50p.c. 25V	
				Diodes		
	D1	36-033-1			Zener 4,3V	
	D2	36-033-1			Zener 4,3V	
	D3	36-039-6			IN4002	
		36-039-8			IN4004	
	D4	36-039-6			IN4002	
		36-039-8			IN4004	
				Resistors		
	R1	20-042-1			Carbon 47 ohms 5p.c. 0,5W	
	R2	20-032-9			Carbon 220 ohms 5p.c. 0,25W	
	R3	20-033-5			Carbon 680 ohms 5p.c. 0,25W	
	R4	20-040-5			Carbon 2,2 ohms 5p.c. 0,5W	
	R5	20-020-9			Carbon 4,7 ohms 10p.c. 1W	



EXTENDED (AUDIO) CONTROL UNIT



EXTENDED (AUDIO) CONTROL UNIT
CIRCUIT DIAGRAM



PCB Track Side:

RCU PCB

COMPONENT LAYOUT