MEASUREMENT/TECHNICAL REPORT

Continental Conair Limited - MODEL: FF925(XXX) FCC ID: LBBFF925

This report concerns (check one:) Orig	ginal Grant_X_	Class II Change
Equipment Type: Low Power Transceiver	(example: computer, n	nodem, transmitter, etc.)
Deferred grant requested per 47 CFR 0.45	7(d)(1)(ii)? Yes	No_X_
	•	lefer until :date
Company Name agrees to notify the Comn	nission by:date	· · · · · · · · · · · · · · · · · · ·
of the intended date of announcement of that date.	the product so that the	e grant can be issued on
Transition Rules Request per 15.37?	Yes	No_X_
If no, assumed Part 15, Subpart C for in Edition] provision.	ntentional radiator - th	e new 47 CFR [10-1-96
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EXHIBIT 6: Technical Specifications

EXHIBIT 7: Instruction Manual

EXHIBIT 8: Security Code Information

EXHIBIT 1 GENERAL DESCRIPTION

1. CIRCUIT DESCRIPTION

1. 1. GENERAL

A. BASE UNIT

- 1). RECEIVER
- 2). DIGITAL SIGNAL
- 3). VOICE SIGNAL
- 4). TRANSMITTER
- 5). RINGER DETECTOR
- 6). POWER SUPPLY CIRCUIT

B. REMOTE UNIT

- 1). RECEIVER
- 2). DIGITAL SIGNAL
- 3). VOICE SIGNAL
- 4). TRANSMITTER
- 5). DIALING SIGNAL
- 6). BATTERY SAVING OPERATION

1.2. SYSTEM OPERATION

- 1). INCOMING CALL
- 2). OUTGOING CALL
- 3). DIALING
- 4). DIGITAL SECURITY CODING

REFERENCE TO THE BLOCK DIAGRAM WILL BE OF CONSIDERABLE HELP IN UNDERSTANDING THE OPERATION OF THE FF925 CIRCUITRY. PLEASE REFER TO THE SCHEMATIC DIAGRAM FOR SPECIFIC COMPONENT DETAILS.

- 1. 1 GENERAL
- A. BASE UNIT

1). RECEIVER

THE RF SIGNAL FROM THE ANTENNA IS FED THROUGH THE ANTENNA DUPLEXER DUP 1 TO THE RF AMPLIFIER Q1.

THE AMPLIFIED RESIGNAL IS THEN HETERODYNED BY 1ST MIXER Q2 WITH THE IST LOCAL SIGNAL SUPPLIED FROM PLL (PHASE-LOCKED-LOOP) FREQUENCY SYNTHESIZER CONSISTING OF RX VCO AND PLL IC IC2, PRODUCING A FIRST IF SIGNAL (10.6875MHz).

THE 1ST IF SIGNAL IS THEN AMPLIFIED BY Q2 THROUGH CERAMIC FILTER CF1 AND CF2 WHICH SUPPRESSES THE 2ND IF IMAGE SIGNAL, AND FED TO 2ND MIXER WITHIN IC1, WHERE THE 1ST IF SIGNAL HETERODYNED WITH 2ND LOCAL SIGNAL SUPPLIED FROM CPU CLOCK OSCILLATOR (8. OMHz), PRODUCING A 2. 6875KHz 2ND IF.

THE 2ND IF SIGNAL IS FED TO THE IF LIMITTER AMPLIFIER WITHIN IC1. THE AMPLIFIED 2ND IF SIGNAL IS THEN DELIVERED TO THE DISCRIMINATOR WITHIN IC1 WHICH PRODUCES AN AUDIO OUTPUT IN RESPONSE TO A CORRESPONDING CHANGE IN THE FREQUENCY OF THE 2ND IF SIGNAL.

THE DISCRIMINATOR OUTPUT SIGNAL CONSISTS OF DIGITAL AND VOICE SIGNALS.

2). DIGITAL SIGNAL

THE DIGITAL SIGNAL WITH "TALK-ON", "TALK-OFF", DIAL DIGIT, FLASH, CHANNEL CHANGE, AND SECURITY CODE IS SHAPED WAVE FROM BY DATA SHAPER WITHIN ICI, AND THEN FED TO THE CPU 1C101. THE CPU DECODES THE DIGITAL SIGNAL TO REFORM REQUIRED OPERATION.

3). VOICE SIGNAL

THE VOICE SIGNAL IS FED TO THE EXPANDER WITHIN IC1 TO BE RETURNED ITS ORIGINAL DYNAMIC RANGE. THE VOICE SIGNAL IS THEN DELIVERED TO THE TELEPHONE LINE THROUGH THE AMPLIFIER WITHIN Q102, HYBRID CIRCUIT Q104, AND THE ISOLATION TRANSFORMER T101.

4). TRANSMITTER

THE VOICE SIGNAL FROM THE TELEPHONE LINE THROUGH THE HYBRID CIRCUIT Q104 IS AMPLIFIED BY Q103 AND FED TO THE COMPRESSOR WITHIN IC1 TO COMPRESS ITS DYNAMIC RANGE. THE COMPRESSED VOICE SIGNAL IS APPLIED TO THE VARACTOR D2 FOR FREQUENCY MODULATION. A 903MHz CARRIER IS PRODUCED BY PLL CIRCUIT CONSISTING OF VCO AND PLL IC IC2. THE MODULATED CARRIER IS AMPLIFIED BY Q4 AND TRANSMITTED INTO THE ANTENNA THROUGH THE DUPLEXER DUP1.

5). RINGER DETECTOR

THE INCOMING RING SIGNAL IS DETECTED BY THE PHOTO COUPLER PC101 WHICH OUTPUT IS CONNECTED PIN 9 OF CPU AND CHECKED ITS FREQUENCY BY CPU. THE "RING" CODE IS THEN GENERATED AND DELIVERED TO THE VARACTOR D2 FOR MODULATION.

6). POWER SUPPLY CIRCUIT

THE POWER SUPPLY CIRCUIT IS COMPOSED OF RIPPLE REJECTION CIRCUIT Q108, 5V REGULATOR CIRCUIT IC207 & IC208, AND REMOTE BATTERY CHARGE REGULATOR CIRCUIT Q109 & D107.

B. REMOTE UNIT

1). RECEIVER

THE RF SIGNAL FROM THE ANTENNA IS FED THROUGH THE ANTENNA DUPLEXER DUP401 TO THE RF AMPLIFIER Q401.

THE AMPLIFIED RF SIGNAL IS THEN HETERODYNED BY 1ST MIXER Q403 WITH THE FIRST LOCAL SIGNAL SUPPLIED FROM PLL FREQUENCY SYNTHESIZER CONSISTING OF RX VCO AND PLL IC 1C402, PRODUCING A FIRST IF SIGNAL (10.6875MHz).

THE 1ST IF SIGNAL IS THEN AMPLIFIED BY Q405 THROUGH CERAMIC FILTER CF402 AND CF403 WHICH SUPPRESES THE 2ND IF IMAGE SIGNAL, AND FED TO 2ND MIXER WITHIN 1C401, WHERE THE 1ST IF SIGNAL IS HETERODYNED WITH 2ND LOCAL SIGNAL (12.375MHz) SUPPLIED FROM THE TRIPLED CPU CLOCK OSCILLATOR (4.125MHz), PRODUCING A 1.6875MHz 2ND IF.

THE 2ND IF SIGNAL IS FED TO THE IF LIMITER AMPLIFIER WITHIN 1C401. THE AMPLIFIED 2ND IF SIGNAL THEN DELIVERED TO THE DISCRIMINATOR WITHIN IC401 AND PRODUCES AS AUDIO OUTPUT IN RESPONSE TO A CORRESPONDING CHANGE IN THE FREQUENCY OF THE 2ND IF SIGNAL.

THE DISCRIMINATOR OUTPUT SIGNAL CONSISTS OF DIGITAL AND VOICE SIGNALS.

2). DIGITAL SIGNAL

THE DIGITAL SIGNAL WITH INCOMING CALL, PAGING CALL, OR A SECURITY CODE IS SHAPED WAVE FORM BY DATA SHAPER WITHIN IC401 AND THEN FED TO THE CPU IC403. THE CPU DECODES THE DIGITAL SIGNAL AND DRIVES THE BUZZER.

3). VOICE SIGNAL

THE VOICE SIGNAL IS FED TO THE EXPANDER WITHIN 10401 TO BE RETURNED ITS ORIGINAL DYNAMIC RANGE. THE VOICE SIGNAL IS THEN DELIVERED TO THE SPEAKER THROUGH THE DRIVE CIRCUIT Q407.

4). TRANSMITTER

THE VOICE SIGNAL ENTERED FROM THE MICROPHONE IS AMPLIFIED BY Q406 AND FED TO THE COMPRESSOR WITHIN IC401 TO BE COMPRESSED ITS DYNAMIC RANGE. THE COMPRESSED VOICE SIGNAL IS APPLIED TO THE VARACTOR D402 FOR FREQUENCY MODULATION. THE 926MHz CARRIER IS PRODUCED BY PLL CIRCUIT CONSISTING OF TX VCO AND PLL IC IC402. THE MODULATED CARRIER IS AMPLIFIED BY Q402 AND TRANSMITTED INTO THE ANTENNA THROUGH THE DUPLEXER DUP401.

5). DIALING SIGNAL

WHEN THE "TALK" KEY IS PRESSED, THE TRANSMITTE CIRCUIT IS ACTIVATED. THEN THE "TALK-ON" DIGITAL DATA WITH ID CODE IS DELIVERED TO THE VARACTOR D402 FOR MODULATION. AFTER THAT THE DIGIT KEY DATA IS SENT TO THE BASE UNIT.

6). BATTERY SAVING OPERATION

THE RECEIVER CIRCUIT UNDER STAND BY MODE WORKS PERIODICALLY TO EXTEND BATTERY LIFE. THE PERIODICAL DC POWER TO THE RECEIVER IS CONTROLLED BY CPU.

1.2. SYSTEM OPERATION

1). INCOMING CALL

WHEN INCOMING RING SIGNAL IS DETECTED BY RINGER DETECTOR, THE TRANSMITTER IS ACTIVATED, AND "RING" CODE IS SENT TO THE REMOTE UNIT ALONG WITH ID CODE FROM PIN 19 OF BASE CPU UNTIL THE RING SIGNAL STOPS.

WHEN "RING" CODE IS DEMODULATED IN THE REMOTE UNIT, THE REMOTE CPU WILL DECODE IT AND GENERATE RING TONE TO THE BUZZER THROUGH THE DRIVE CIRCUIT Q411.

2). OUTGOING CALL

WHEN "TALK" KEY ON THE REMOTE UNIT IS PRESSED, PIN 17 OF REMOTE CPU GOES "LOW", CAUSING TX B+ SWITCH Q409 TO TURN ON. THEN THE TRANSMITTER IS ACTIVATED AND "TALK-ON" CODE IS SENT TO THE BASE UNIT ALONG WITH ID CODE GENERATED FROM PIN 19 OF CPU.

WHEN THE BASE CPU DECODES "TALK-ON" CODE AND THE REMOTE 1D CODE COINCIDE WITH THE BASE ID CODE, PIN-23 OF THE BASE CPU GOES "HIGH". AND THEN THE TEL. LINE LOOP RELAY RLY101 IS ACTIVATED.

3). DIALING

THE DIAL SIGNAL IS SENT TO THE BASE UNIT ACCORDING TO THE PRESSED KEY.

UPON RECEIPT OF DIAL SIGNAL, THE BASE UNIT GENERATES EITHER PULSE DIAL SIGNAL OR DTMF TONE SIGNAL ACCORDING TO THE TEL. LINE MODE SELECT SWITCH SW101 POSITION.

UPON RECEIPT OF "*" SIGNAL AT PULSE MODE, THE BASE UNIT CHANGES DIAL MODE TO TONE MODE UNTIL THE LINE IS TERMINATED.

UPON RECEIPT OF "FLASH" SIGNAL, THE BASE UNIT OPENS THE TEL. LINE LOOP FOR A MOMENT.

UPON RECEIPT OF "REDIAL" SIGNAL, THE BASE UNIT OUTPUTS THE SAME DIAL DIGIT AS THE LAST DIAL WHICH STORED IN BASE CPU MEMORY.

UPON RECEIPT OF "MEMORY" + "LOCATION NO." SIGNAL, THE BASE UNIT RECALL THE DIAL DIGITS WHICH STORED IN THE BASE CPU MEMORY AND OUTPUTS THEM TO THE TEL. LINE.

2. Part list

BASE

REF. No.	DESCRIPTION	VENDER	
CF1	DIELEC. BPF B69812-N9266-A803	STEMENS	
CF2	CER. FILTER SFE10.7MJA10-A	MURATA	
CF3	CER. FILTER SFE10.7MS2-A	MURATA	
D1	DIODE CHIP DAN217	ROLM	
D2/3	DIODE CHIP VARACTOR HVU202A	HITACHI	
D107	DIODE ZENER MTZJ8.2B	ROHM	
DUP1	SAW DUPLEXER B4008	SIEMENS	
IC1	IC IF/COMPANDOR TK10762V		
1C2	IC PLL TB31216FN	TOSHTBA	
1C101	IC CPU TMP87P808M	TOSHIBA	
IC207/208	TC REGULATOR KA7805	SAMSUNG	
L4	COIL 7PLY 2.6875MHz	TOKO	
L9	CHIP INDUCTOR 2. 7uH TAIY		
L15	CHIP INDUCTOR 3.9uH	TATYO YUDEN	
PC101/201	PHOTO COUPLER PS2501-1	NEC	
Q1	CHIP TRANSISTOR NPN 2SC4899YII HITACI		
Q2/3/4			
Q102/103/104	2/103/104 CHIP_TRANSISTOR_NPN_BC846BLT1 MOTO		
Q109	TRANSISTOR NPN LM8050J		
T101	HYBRID TRANS EI-24 AEC-789/922	ALPHA	
TC1/2	2 CHIP TRIMMER TC13C060C 6pF SCIMAREC		

REMOTE

REF. No.	DESCRIPTION	VENDER		
CF401	DIELEC. BPF B69812-N9046-A803	SIEMENS		
CF402	CER. FILTER SFEIO. 7MJA10-A	MURATA		
CF403	CER. FILTER SFE10.7MS2-A	MURATA		
D401/402	DIODE CHIP VARACTOR HVU202A	HITACHI		
DUP401	SAW DUPLEXER B4009	SIEMENS		
IC401 IC IF/COMPANDOR TK10762V		ТОКО		
[C402	IC PLL TB31216FN	TOSHIBA		
IC403 IC CPU TMP87P808M		TOSHIBA		
IC404	REG. IC 3V TK11230BM	ТОКО		
L412	CHIP INDUCTOR 3. 3uH	TATYO YUDEN		
L413	COIL 7PLY I.6875MHz	ТОКО		
L415	CHIP INDUCTOR 10uff	TATYO YUDEN		
1.416	CHIP INDUCTOR 6, 8uH	TATYO YUDEN		
Q401	CHIP TRANSISTOR 2SC4899YH	HITACHI		
Q402/403/405	CHIP TRANSISTOR NPN 2SC4570T73	NEC		
Q406/407/410	CHIP TRANSISTOR NPN BC846BLT1	MOTOROLA		
Q411/Q412				
Q409	CHIP TRANSISTOR PNP BC856BLT1	MOTOROLA		
TC401/402	CHIP TRIMMER TC13C060C 6pF	SCIMAREC		

3. THE PROTECTION FROM UNINTENTIONAL ACCESS

AS EXPLAINED AT THE ITEM 1.2 4) DIGITAL SECURITY CODING OF THE CIRCUIT DESCRIPTION.

THE FF925 INCORPORATES THE 16-BITS DIGITAL SECURITY CODE. ACCESS TO THE TELEPHONE NETWORK OCCURS ONLY IF THE CODE TRANSMITTED BY THE HANDSET MATCHES CODE SET IN THE BASE UNIT. SIMILARLY, RINGING OF THE HANDSET OCCURS ONLY IF THE CODE TRANSMITTED BY THE BASE UNIT MATCHES THE CODE SET IN THE HANDSET.

4. Description of ch scanning

1) CHANNEL FREQUENCY PLAN

RÉFÉR TO TABLE 1.

2) CHANNEL FREQUENCY MAP & CHANNEL ADVANCE SEQUENCE

REFER TO TABLE 2.

- 3) CONTROL CHANNEL
- (1) CONTROL CHANNEL IS THE CHANNEL WHICH BOTH REMOTE AND BASE UNIT WILL USE FOR CONNECTION CONTROL. IN STANDBY MODE THE BOTH UNITS WILL STAY ON THIS CHANNEL. AS LONG AS THE CONTROL CHANNEL IS EMPTY (NOT OCCUPIED), IT IS USED FOR THE VOICE CHANNEL ALSO.
- (2) THE CONTROL CHANNEL IS SELECTED RANDOMLY BY BASE UNIT AT SET UP SEQUENCE WHEN REMOTE UNIT IS CRADLED ON BASE UNIT. THE CONTROL CHANNEL IS SELECTED FROM CHI ~ CH36, AND THE CH40 IS USED FOR THE
- (3) BASE UNIT WILL AUTOMATICALLY SCAN THE EMPTY CHANNELS ON STANDBY MODE AS DESCRIBED IN ITEM 4. THE NEW CHANNEL INFORMATION SELECTED AS A NEW CONTROL CHANNEL WILL BE SENT TO REMOTE UNIT DURING THE OUTGOING CALL SEQUENCE OR THE INCOMING CALL SEQUENCE.
- 4) AUTO SCAN AND CHANNEL SELECT
- (1) BÁSÉ ÜNÍT WILL NOT START SCAN OTHÉR CHANNELS AS LONG AS THE CURRENT CONTROL CHANNEL IS EMPTY.
- (2) IF THE RF CARRIER IS DETECTED ON THE CONTROL CHANNEL, THE OUTGOING CALL SIGNAL FROM REMOTE UNIT IS MONITORED FOR 300msec.
- (3) IF THE CONTROL CHANNEL IS OCCUPIED, BASE UNIT WILL START TO SCAN OTHER CHANNELS. THE CHANNEL SCANNING SEQUENCE IS SHOWN IN TABLE 2.
- (4) THE CHANNEL WHICH IS FOUND OUT AS A EMPTY CHANNEL WILL BE MEMORIZED AS A NEW VOICE CHANNEL IN BASE UNIT.
- (5) THE NEW VOICE CHANNEL WILL BE SCANNED TO CHECK THE EMPTINESS IN EVERY 500msec.

BASE REMOTE CH TX Freq. TX VCO RX Freq. RX VCO TX Freq. TX VCO RX Freq. 1 902.2500 902.2500 925.3125 914.6250 925.3125 925.3125 902.2500 2 902.3125 902.3125 925.3750 925.3750 925.3750 902.3125 3 902.3750 902.3750 925.4375 914.7500 925.4375 925.4375 902.3750 4 902.4375 902.4375 925.5000 914.8125 925.5000 925.5000 902.4375 5 902.5000 902.5000 925.5625 914.8750 925.5625 925.5623 902.5000 6 902.5625 902.5625 925.6250 914.9375 925.6250 925.6250 902.5625 7 902.6250 902.6250 915.0000 925.6875 925.6875 925.7500 925.7500 902.6250 8 902.6875 902.6875 925.7500 915.0625 925.7500 925.8125 902.	RX VCO 912.9375 913.0000 913.0625 913.1250 913.1875		
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	913.3750		
	913.4375		
10 902.8125 902.8125 925.8750 915.1875 925.8750 925.8750 902.8125	913.5000		
11 902.8750 902.8750 925.9375 915.2500 925.9375 925.9375 902.8750	913.5625		
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13 903.0000 903.0000 926.0625 915.3750 926.0625 926.0625 903.0000	913.6875		
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25 903.7500 903.7500 926.8125 916.1250 926.8125 926.8125 903.7500	914.4375		
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27 903.8750 903.8750 926.9375 916.2500 926.9375 926.9375 903.8750	914.5625		
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38 904.5625 904.5625 927.6250 916.9375 927.6250 927.6250 904.5625	915.2500		
39 904.6250 904.6250 927.6875 917.0000 927.6875 927.6875 904.6250	915.3125		
40 904.6875 904.6875 927.7500 917.0625 927.7500 927.7500 904.6875	915.3750		
CPU CLK 8.0000 4.125			
2ND LO. 8.0000 12.375			
1ST IF 10.6875 10.6875			
2ND IF 2.6875 1.6875			

TABLE 2 CHANNEL FREQUENCY MAP	13 17 25 29 33 37	14 18 22 26 30 34 38	15 19 23 27 31 35 39	12 16 20 24 28 32 36 40	vs. $\rightarrow 13 \rightarrow 21 \rightarrow 29 \rightarrow 37 \rightarrow 2 \rightarrow 10 \rightarrow 18 \rightarrow 26 \rightarrow 34 \rightarrow 6 \rightarrow 14 \rightarrow \cdots \rightarrow 32 \rightarrow 40 \rightarrow 1 \rightarrow 9$	
	21	18 22	19 23	20 24	→ 37 →	
į.	5 9 13	6 10 1	3 7 11	4 8 12	Cannel advance shall be done as follows. $1 \rightarrow 9 \rightarrow 17 \rightarrow 25 \rightarrow 33 \rightarrow 5 \rightarrow 13 \rightarrow$	
		5			Cannel adv	

1.2 Related Submittal(s) Grants

This is an Application for Certification of a cordless telephone system. Two transmitters are included in this Application. This specific report details the emission characteristics of each transmitter. The receivers are subject to the verification authorization process, in accordance with 15.101(b). A verification report has been prepared for the receiver sections of each device. The device is also subject to Part 68 Registration.

1.3 Test Methodology

Both AC mains line-conducted and radiated emission measurements were performed according to the procedures in ANSI C63.4 (1992). All measurements were performed in Open Area Test Sites. Preliminary scans were performed in the Open Area Test Sites only to determine worst case modes. For each scan, the procedure for maximizing emissions in Appendices D and E were followed. All Radiated tests were performed at an antenna to EUT distance of 3 meters, unless stated otherwise in the "Justification Section" of this Application.

1.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located at Garment Centre, 576 Castle Peak Road, Kowloon, Hong Kong. This test facility and site measurement data have been fully placed on file with the FCC.

EXHIBIT 4 EQUIPMENT PHOTOGRAPHS

4.0 **Equipment Photographs**

Photographs of the tested EUT are attached.

1.0 General Description

1.1 Product Description

The FF925(XXX) is a 40 Channel Analog Modulation Cordless Phone with Digital Answering Machine. The unit is capable of either tone or pulse dialing. The internal power supply's isolation is accomplished through a power transformer having an adequate dielectric rating. The circuit wiring is consistent under the requirement of part 68.

The handset unit consists of a keypad with twelve standard keys (0, ..., 9, *, #), five function keys (memo, redial, flash, remote and intercom), and one channel switch key. A talk key is provided to control pick/release telephone line in a toggle base.

The base unit has a page/intercom key, which is used to page and talk with the handset unit.

The circuit description is listed in the following page.

Connection between the device and the telephone network is accomplished through the use of USOC RJ11C in the 2-wire loop calling central office line.