

**CES**

**MODEL 5000C**

**PHONE REMOTE**

**USER/SERVICE MANUAL**

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## MODEL 5000C DESCRIPTION

The Model 5000 Telephone Remote is a microprocessor controlled interface between a base station, and a telephone line, or in-house telephone system. It allows the base station to be accessed from a touch tone telephone in a variety of applications. Communications can be initiated from a touch tone telephone, or from a mobile, by activating a pre-programmed auto-dial telephone number. Mobile activity and call limit timers are provided in case the phone connection is lost. All operational features are switch programmable.

### PROGRAMMABLE FEATURES

SECURITY CODE	* plus 2 digits
ACTIVITY TIMER	3, 5, 10, or 15 minutes with time-out warning beeps
PUSH-TO-TALK TIMER	1,2,3 or 4 minutes with time-out warning beeps
RING COUNTER	answer on 1st, 2nd, 6th or 10th ring with a beep
AUTO-DIAL TELEPHONE NO.	1 telephone number factory programmed (available as rotary dialing only)

### APPLICATIONS

#### DIAL-UP REMOTE

The Model #5000 Telephone Remote can be located at a regular dispatch point, to allow telephone access to the radio when the dispatcher is not present. The pre-programmed telephone number can be used by a mobile to dial a secondary dispatch point when the dispatcher is not present. When the pre-programmed auto-dial telephone number is used, the number dialed should be a dedicated line. The unit can share one of the office telephone lines or a separate telephone line can be used.

The Telephone Remote can be used to allow a radio to be located at a remote site. This allows easier installation in many locations where it is not possible to run wires or coaxial cables from the office to the radio, or where the tower site is some distance from the office. It also allows access from more than one dispatch point.

Communications is initiated from a telephone by dialing the telephone number, and entering the security code. To transmit, push "\*" and to receive push "#". PTT is always controlled by the telephone. To cease operation enter the "off" code. If the telephone connection is lost, the PTT and activity timers will time-out and disconnect.

For a mobile to initiate communications, the pre-programmed auto-dial telephone number must be activated. Either one or three bursts (switch selectable) of PTT, depending on whether mobile to mobile communication is necessary, will dial the pre-programmed telephone number. If mobile to mobile communication is required, three bursts should be selected.

#### IN-HOUSE TELEPHONE SYSTEM

The Model #5000C Telephone Remote can connect to one of the telephone line ports of any multi-line in-house business telephone system, with the use of a ringdown circuit (Proctor Model 46220). This allows access to the radio from any in-house telephone. A ringdown circuit is a telephone device that has connections for two telephones. If either telephone goes off-hook, the other telephone rings.

Communication is initiated from any in-house telephone by lifting the handset and pushing the line button that Telephone Remote is connected to. After a beep is heard, operation is the same as above, using "\*" to transmit and "#" to receive. In this mode it is not necessary to enter the security code.

Communication is initiated by a mobile the same as above, however, no telephone number is dialed. Instead, the connect relay to the ringdown circuit is closed (switch option). The ringdown circuit will then ring the incoming line. To answer the call, push the line button, lift the handset, and push "\*" to transmit.

#### INSTALLATION

All connections from the radio to the Model 5000 will be made through the DB15 connector, on the rear of the unit. A separate cord is provided for connecting to the telephone line. There is also a miniature phone jack for connecting an external speaker if your application requires it. Wire the cable into the transceiver using the chart below.

<u>PIN #</u>	<u>CABLE</u>	<u>WIRE COLOR</u>	<u>FUNCTION</u>
1	2	BLACK	GROUND
2	1	GREEN	PUSH-TO-TALK
3	1	RED	TRANSMIT AUDIO
4	-	NONE	NOT USED
5	3	RED	SPEAKER AUDIO IN
6	3	BLACK	GROUND
7	1	BLACK	C.O.R. OR CTCSS SWITCH
8	2	RED	+ 12 VDC
9	1	SHIELD	GROUND
10	1	BROWN	RELAY NORMALLY OPEN
11	1	ORANGE	RELAY NORMALLY CLOSED
12	1	YELLOW	RELAY WIPER
13	-	NONE	NOT USED

14	-	NONE	NOT USED
15	-	NONE	NOT USED

NOTE 1 - When connecting the SPEAKER AUDIO IN and SPEAKER AUDIO OUT wires, first remove the wire from the speaker. The SPEAKER AUDIO IN wire connects to that wire. The SPEAKER AUDIO OUT wire is then connected to the speaker. An external speaker can be plugged into the external speaker jack if desired, and the SPEAKER AUDIO OUT wire not used. The speaker will be muted when the 5000 is in use.

NOTE 2 - (COR-CTCSS input) "Black wire". This is a signal from the receiver's squelch switch OR CTCSS decoder that will alert the 5000C to auto dial the factory programmed telephone number. This signal must be at least .7 volts or higher and go to ground when active or open squelch. If there will be co-channel users, it would be best to use the logic from a CTCSS decoder or other decoder for this connection. This will eliminate the possibility of someone outside of your group activating the auto dial feature. In most cases the logic from the decoder in the base station, if equipped, can be utilized. Also see PTT Count Select on page 5.

NOTE 3 - Auxiliary relay contacts, the brown, orange and yellow wires, go to uncommitted relay contacts. These contacts close during the connect mode. One possible use for these contacts would be to interrupt the hang up or monitor line in the transceiver if needed.

#### TELEPHONE LINE

If the 5000 will be used as a dial-up remote, plug the telephone cord into the telephone line. If the 5000 will be used with an in-house telephone system, plug the telephone cord into a Proctor Model 46220. Connect the other side of the Proctor Model 46220 to one of the telephone line ports of the in-house telephone system.

#### PROGRAMMING

REMOVE THE TOP OF THE CABINET BY REMOVING THE TWO REAR SCREWS

#### ON/OFF CODE

The "ON" code is "\*" plus 2 digits. The "OFF" code is "#" plus the same 2 digits. The "\*" and "#" cannot be used as either of the programmed digits. The "ON/OFF" code is programmed using the 8 position switch S3. Set the switches as shown below. Setting the switches to any settings that are not shown below will cause the unit to not function. The factory setting is 74.

1ST DIGIT	SW 1	SW2	SW3	SW4
(Use these switches in conjunction with Chart A)				
2ND DIGIT	SW5	SW6	SW7	SW8

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CHART A

1	OFF	ON	ON	ON
2	ON	OFF	ON	ON
3	OFF	OFF	ON	ON
4	ON	ON	OFF	ON
5	OFF	ON	OFF	ON
6	ON	OFF	OFF	ON
7	OFF	OFF	OFF	ON
8	ON	ON	ON	OFF
9	OFF	ON	ON	OFF
0	ON	OFF	ON	OFF
A	OFF	ON	OFF	OFF
B	ON	OFF	OFF	OFF
C	OFF	OFF	OFF	OFF
D	ON	ON	ON	ON

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THE REMAINING PROGRAMMING IS DONE USING THE 8 POSITION SWITCH S2.

RING COUNTER

The ring counter programming determines how many times the telephone rings before Telephone Remote answers. If the unit is sharing a line with a telephone you would use 6 or 10 rings. The factory setting is 1 ring.

RING	SW1	SW2
1	OFF	OFF
2	ON	OFF
6	OFF	ON
10	ON	ON

PUSH-TO-TALK TIMER

The push-to-talk timer determines how long any one transmission can be. Set the switches for the longest transmission you expect to make. Time-out warning beeps will be heard 10 seconds before time-out. This timer can be reset by pushing "\*" button. The factory setting is 1 minute.

MIN	SW3	SW4
1	OFF	OFF
2	ON	OFF
3	OFF	ON
4	ON	ON

#### ACTIVITY TIMER

The activity timer determines how long the Telephone Remote will remain connected to the telephone line if there is no activity on the touch tone pad. If you expect to sometimes use PHONE REMOTE to just monitor, you would want one of the long times. Time-out warning beeps will be heard 30 seconds before disconnect. To reset this time push the "#" button. The factory setting is 3 minutes.

MIN	SW5	SW6
3	OFF	OFF
5	ON	OFF
10	OFF	ON
15	ON	ON

#### PTT COUNT SELECT

The mobile operator can initiate a call to the dispatch point by keying the PTT switch, either one or three times, depending on the setting of S2 switch 8. If switch 8 is "ON", keying the mobile PTT one time will initiate a call. Switch 8 should be "ON" only if there is no mobile to mobile communication required. If switch 8 is "OFF", it will be necessary to key the PTT three times at approximately one second intervals. Having to use PTT three times allows mobile to mobile communication to take place without initiating a call to the office.

#### MODE SWITCH

The Model 5000 can be used as a dial-up remote, or with an in-house telephone system to allow radio access from any in-house telephone. If the 5000 is used as a dial-up remote, S2 switch 7 should be "OFF". If the 5000 is connected to an in-house telephone system through a Proctor Model 46220, S2 switch 7 should be "ON".

S2, SW7 OFF-When the 5000 sees ringing, the "off hook" LED comes on. The caller now has 30 seconds to send the connect code consisting of a \* and two digits. When the connect code is sent, the "busy" light comes on. The unit timers start upon receipt of the connect code.

S2, SW7 On-When the 5000 sees ringing, both the "off hook", and "busy" lights come on. The unit will now look for only \*,s or #,s, as its already in a busy condition. (No security digits are needed) The unit timers start immediately upon connect. The unit is "hung-up" by sending the off code, regardless of the position of S2, Sw7.

#### ADJUSTMENTS

The following adjustments are most easily made by having someone access the Telephone Remote from a telephone (see operation section). Use a dummy load on the base station when testing. Refer to the assembly drawing to locate the adjustments.

#### TRANSMIT AUDIO

Adjust the transmit level control for normal modulation of the base station by the audio from the telephone.

#### RECEIVE AUDIO

Adjust the volume control on the base station so that receive audio produces normal level on the telephone. Mark this setting for future reference. There is also a receive audio level control inside the unit.

#### HYBRID BALANCE

Used to null out RX audio when unsquelched audio is being used (I.E. SSB mode). It will not be necessary to adjust the hybrid balance (R6), if you are using squelched receiver audio. To make the adjustment connect an oscilloscope to the test point located near the transformer. Have someone access the unit from a telephone but do not send the "\*" to transmit. While a modulated signal is being received on the base station, adjust the hybrid balance control for minimum signal on the oscilloscope.

### OPERATION

#### DIAL-UP REMOTE

In this application the telephone remote is installed at an office location where a dispatcher is normally present, to allow telephone access to the radio after normal business hours. When leaving the office, turn "ON" the Model #5000, put the radio in the "MONITOR" mode, and adjust the volume control to the previously determined setting. Telephone remote can also be located at a remote radio site.

For remote operation, dial the telephone number that the telephone remote is connected to. When the telephone remote answers, enter the "ON" code using the touch tone phone. You will then hear the receiver audio. To transmit, momentarily push the "\*" button. To go back to receive momentarily push the "#" button. Use the "\*" and "#" buttons to go back and forth between transmit and receive. If you hear time-out beeps while in receive, push the "#" button to reset the activity timer. If you hear time-out beeps while in transmit, push the "\*" button. When you wish to cease operation, enter the "OFF" code and hang up the phone.

The mobile operator can initiate a call to the office by keying the PTT switch, either one or three times, depending on the setting of S2 switch 8. If switch 8 is "ON", keying the mobile PTT one time will initiate a call. If switch 8 is "OFF", it will be necessary to key the PTT three times at approximately one second intervals.

If communication will be initiated by a mobile using the auto-dial feature, the telephone number dialed should be a dedicated line used only for mobile calls. When answering a call, the "\*" must be pushed to activate PTT before talking.

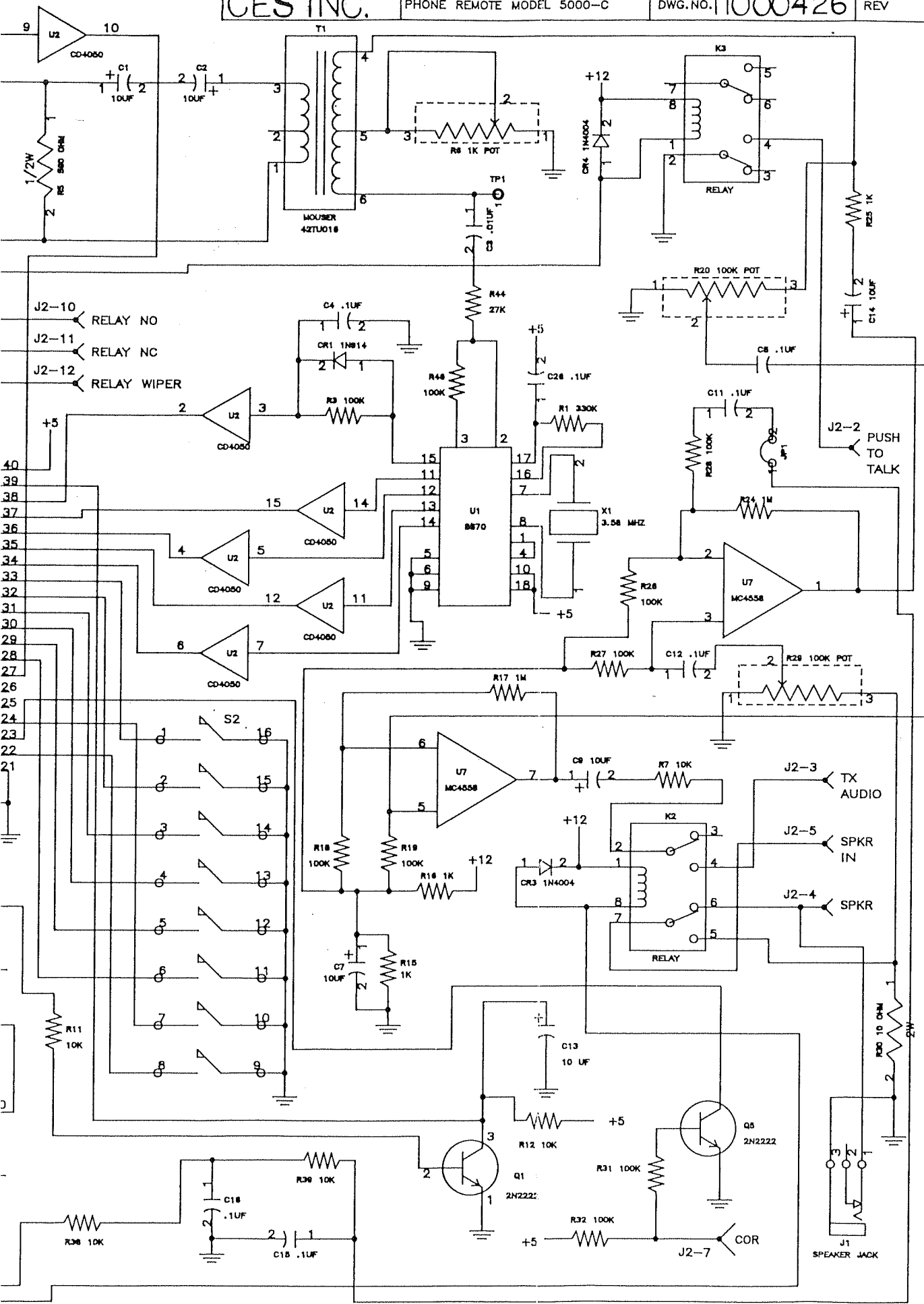
#### IN-HOUSE TELEPHONE SYSTEM

Communication is initiated from any in-house telephone by lifting the handset and pushing the line button that the telephone remote is connected to. After a beep is heard, operation is the same as above, using "\*" to transmit and "#" to receive. In this mode it is not necessary to enter the security code. Communication is initiated by a mobile the same as above, however no telephone number is dialed. Instead the connect relay to the ringdown circuit is closed (switch option). The ringdown circuit will then ring the incoming line. To answer the call, push the line button, lift the handset, and push "\*" to transmit.



## CES MODEL 5000C PARTS LIST

SYMBOL NUMBER	DESCRIPTION	CES PART NUMBER
Manual	Operator/Service Manual	04100599
U1	8870 DTMF DECODER	U8870
U2	4050 Hex Buffer	U4050
U3	4538 Dual One Shot	U4538
U4	Microprocessor	U38P70
U4A	E Prom (Mounted on top of U4)	U2716
U6	4011 Nand Gate	U4011
U7	4558 Op Amp	U4588
Q1-Q5	2N2222 Transistor	U2222
VR1	2805 Voltage Regulator	U2805
OC1	VTL3B 19 Optic Isolator	CLM34
D1-D4	LED, Right Angle	LED
K1-3	Relay, 12 Volt	RELAY1
X1-2	Crystal 3.58 Mhz.	XTAL 3
S1	Switch	SW8
S2-3	Switch, 8 pos. DIP	SWD 08
T1	Transformer	TRAN 1 J1
E1-2	Terminal	CON 12
F1 Clips	Fuse Clips	F CLIP
R1	Resistor 330K $\Omega$ , 1/4 Watt Resistor	R330K
R2	" 47K $\Omega$ , " " "	R47K
R3,18,19,22,26,27, 28,31,32,46	" 100K $\Omega$ , " " "	R100K
R4,10,13,15,16,25,43	" 1000 $\Omega$ , " " "	R1K
R6	1000 $\Omega$ Potentiometer	RV1K
R7,11,12,23,38,42	" 10K $\Omega$ , " " "	R10K
R8,9,17,24	" 1Meg $\Omega$ , " " "	R1M
R14	" 10Meg $\Omega$ , " " "	R10M
R20,29	" 100K $\Omega$ , Potentiometer	RV104
R44	" 27K $\Omega$ , 1/4 Watt Resistor	R27K
R5	" 560 $\Omega$ , 1/2 Watt "	RB560
R30	" 10 $\Omega$ , 2 Watt "	RE10R
CR1,5	Diode 1N914	D914
CR2,3,4,6	" 1N4004	D4004
C3,55,8,11,12,15,16,18,26	Capacitor, 10 UF 16 V. Tantalum	CT10
C6	" , .1 Uf " "	CM104
C17	" , 470 Uf. " "	CE470
1 ea.	8 Pin I.C. Socket	SOC 08
1 ea.	14 Pin I.C. Socket	SOC 14
2 ea.	14 Pin I.C. Socket	SOC 16
1 ea.	18 Pin I.C. Socket	SOC 18
1 ea.	40 Pin I.C. Socket	SOC 40



- J2-10 RELAY NO
- J2-11 RELAY NC
- J2-12 RELAY WIPER

- 40
- 39
- 38
- 37
- 36
- 35
- 34
- 33
- 32
- 31
- 30
- 29
- 28
- 27
- 26
- 25
- 24
- 23
- 22
- 21

PUSH TO TALK

J2-3 TX AUDIO

J2-5 SPKR IN

J2-4 SPKR

J1 SPEAKER JACK

J2-7 COR

PROGRAMMING OF ON/OFF CODE  
(S3 LOCATION 1,2,3,4,5,6,7,8)

PROGRAMMING OF  
RING COUNTER (S2 LOCATION 1,2)  
PUSH-TO-TALK TIMER (S2 LOCATION 3,4)  
ACTIVITY TIMER (S2 LOCATION 5,6)  
PTT COUNT SELECT (S2 LOCATION 8)  
MODE SWITCH (S2 LOCATION 7)

SPEAKER JACK

ADJUSTMENT OF  
HYBRID BALANCE (R6)

TEST POINT FOR HYBRID BALANCE  
ADJUSTMENT (TP1)

ADJUSTMENT FOR  
TRANSMIT AUDIO (R20)

ADJUSTMENT FOR  
RECEIVE AUDIO (R29)

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