

ElectroKey

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A. UNPACKING/SETUP

1.01 Use care when opening all cartons. Inspect each carton closely for miscellaneous material, e.g. documents, handsets, jackboxes, etc. Save the cartons until each piece of equipment has been installed and thoroughly tested. Do not attempt to repair or modify a console in the field; attempting to do so will void the warranty. Be sure to turn the power switch to ON. The switch is factory set to OFF for shipment. If it is necessary to return the item, the original factory packaging should be used.

B. LINE KEY DESIGNATIONS

1.02 LABELS: You will find a sheet of labels packed in with the documents for each console. These labels are to be applied to the legend-insert under the clear plastic cap of each line key. The labels may be used to identify the particular key as to telephone number, tie-line name, etc. Two lines of five characters each may be typed on each label. The use of a memory typewriter is recommended for multiple label designations. For color coding of labels, standard "highlighter" marking pens of different colors may be used before the designations are typed on, and before the label is removed from its backing.

1.03 LINE KEYS: First, make a "cap removing tool" by straightening out one end of a paper clip and bending a short 1/4" hook at the end. The clear plastic cap assembly of each line key may then be removed by hooking the rear of the cap at the bottom edge (opposite the LEDs) and pulling gently straight up. Once the cap assembly has been removed, the two-piece unit may be separated by laying the cap assembly on its side edge and inserting a flat, sharp blade such as an "X-ACTO" tool or single edge razor blade, between the clear and black pieces. Use caution when separating these two pieces. Once separated, the imprinted labels may then be applied to the legend-insert below the two-punched LED holes. The legend-insert is then placed on the black base, and the clear plastic cover is snapped back into place. The complete assembly is then snapped back onto the switch base.

C. ELECTRICAL CHARACTERISTICS

B-battery	-24V
Console current	500ma
Ringer voltage	-24VDC/105VAC
Ringer current	10ma
Red LED voltage	-24VDC or 10VAC
Red LED current	14ma

D. CABLING/BRIDGING ADAPTERS

1.04 The following cable color code assignment table is a typical 10-line assignment. Repeat this table for each additional 10-line increment.

TABLE A - CAD				
CIRCUIT	LEAD DESIG	COLOR	PIN NO.	'66 BLOCK ROW
1	T	W-BL	26	1
	R	BL-W	1	2
	A	W-O	27	3
	L	O-W	2	4
2	T	W-G	28	5
	R	G-W	3	6
	A	W-BR	29	7
	L	BR-W	4	8
3	T	W-S	30	9
	R	S-W	5	10
	A	R-BL	31	11
	L	BL-R	6	12
4	T	R-O	32	13
	R	O-R	7	14
	A	R-G	33	15
	L	G-R	8	16
5	T	R-BR	34	17
	R	BR-R	9	18
	A	R-S	35	19
	L	S-R	10	20
6	T	BK-BL	36	21
	R	BL-BK	11	22
	A	BK-O	37	23
	L	O-BK	12	24
7	T	BK-G	38	25
	R	G-BK	13	26
	A	BK-BR	39	27
	L	BR-BK	14	28
8	T	BK-S	40	29
	R	S-BK	15	30
	A	Y-BL	41	31
	L	BL-Y	16	32
9	T	Y-O	42	33
	R	O-Y	17	34
	A	Y-G	43	35
	L	G-Y	18	36
10	T	Y-BR	44	37
	R	BR-Y	19	38
	A	Y-S	45	39
	L	S-Y	20	40
MISC. SEE SEC. F	T	V-BL	46	41*
	R	BL-V	21	42*
	-24V	V-O	47	43*
	BZ	O-V	22	44
	C1	V-G	48	45*
	C2	G-V	23	46*
	GND	V-BR	49	47
	LG/A1	BR-V	24	48
	LG/B1	V-S	50	49
	R1	S-V	25	50*

* See Section 1.05

1.05 Internal multiples of wiring within the console back-feed various voltages, etc. on these wires (cables 2 and above). The installer may wish to use the following Siemon insulating clips on the '66' block terminals.

- S-779-916 (2 slot)
- S-779-78 (3 slot)
- S-779-134 (6 slot)

1.06 Ten-line consoles and lines 1-10 on larger consoles cannot be bridged using bridging adapters. Lines 20-30 and above may be bridged between consoles in groups of 10 using the 830601-01401 bridging adapter. This specially wired adapter avoids wiring the miscellaneous signals (see Table A). The miscellaneous wiring within this group must *not* be bridged. Conventionally wired 25-pair bridging adapters must *not* be used on ElectroKey consoles.

E. CROSS CONNECTIONS - LINES

1.07 Cross-connect lines 1-10 (TRAL) to Key Service Unit lines 1-10, as shown in Table A. Repeat for additional groups of 10 lines.

F. CROSS CONNECTIONS - MISC

1.08 Run the miscellaneous cross-connections on the V-BL to S-V cable pairs shown on the color code assignment table on the first (lines 1-10) cable *only* with the exception of the LG conductors mentioned in paragraphs e. and f. below. These connections are multiplied to other groups of lines internal within the console via factory wiring.

- a. Cross-connect the console common T&R (V-BL, BL-V) pair to any external connecting device requiring parallel connection to the console common talk pair.
- b. Cross-connect -24V from a source originating at the key system power supply (B battery) to the V-O conductor.
- c. The dry contact closure of the C1-C2 leads (V-G, G-V pair) close upon the operation of any line key, and indicate a console "off-hook" condition. This "off-hook" indication may be used for whatever purpose may be required; for example, busy lamp field, recorder connector start, radio headset transfer interface, call management information, etc. The installer shall cross-connect this pair as required.

- d. Cross-connect earth ground (GND) from a source originating at the key system power supply to the V-BR conductor. The installer shall ensure that a good street side of meter, water-pipe earth-ground is connected to the GND terminal of the key system power supply.
- e. Cross-connect lamp ground (LG/A1) from an earth ground source originating at the key system power supply to the BR-V conductor on *each* group of 10 lines.
- f. Cross-connect the LG/B1 lead from an earth ground source originating at the key service unit to the V-S conductor on *each* group of 10 lines.
- g. Cross-connect the R1 common audible lead from the key service unit to the console ringer S-V conductor.
- h. Cross-connect the 10 VAC buzzer wired to the O-V and V-BR wires on the first (lines 1-10) cable to an intercom buzzer signaling circuit as required.

G. CONNECTIONS - EXTERNAL DEVICE LOCATED AT THE CONSOLE TO COMMON T&R

1.09 To connect a parallel device to a flush-mount console common T&R pair -at the console- wire the device to the miscellaneous terminal strip T&R connections, located at the rear panel.

1.10 To connect a parallel device to a desk-top console common T&R pair -at the console- use a 6-wire modular cord with either a 6-wire modular jack at each end, or spade lugs on one end, depending on the requirements of the external device. Insert the cord into the CMTR JACK. The CMTR switch remains in the INT position.

1.11 To connect a series device to a flush-mount console common T&R pair at the console:

- a. Using the miscellaneous terminal strip:
 - 1. Remove the factory installed jumpers between terminals 1 & 2 and 3 & 4.
 - 2. Connect the device line side to terminals 1 & 3 and connect the equipment side to terminals 2 & 4.

- 3. The CMTR switch remains in the INT position.
- b. Using the 6-wire modular CMTR jack:
 - 1. Use a 6-wire modular cord with either a 6-wire modular to modular plug at each end, or spade lugs at one end depending on the requirements of the external device.
 - 2. Insert the cord into the CMTR jack. The CMTR switch is then set to the EXT position.
 - 3. The device line side of the modular cord is the R & G conductors. The equipment side is the Y & BK conductors.

1.12 To connect a series device to a desk-top console, use a 6-wire modular cord connected to the CMTR jack as follows:

- 1. Use a 6-wire modular cord with either a 6-wire modular to modular plug at each end or spade lugs at one end, depending on the requirements of the external device.
- 2. Insert the cord into the CMTR jack. The CMTR switch is then set to the EXT position.
- 3. The device line side of the modular cord is the R & G conductors. The equipment side is the Y & BK conductors.

H. JACKBOX CONNECTIONS - WITH RADIO SYSTEM

1.13 To use the same headset for both radio and telephone operation, connect the flush-mount panel headset transfer terminal strip to a Motorola or similar type radio console as shown on the ElectroKey Flush Mount drawing, 830652-00205 Fig. 2B, located on page 15.

- a. Connect the transmit pair from the radio to terminal 1 (TX1) and terminal 2 (TX2).
- b. Connect the receive pair from the radio to terminal 3 (RCV1) and terminal 4 (RCV2).
- c. Connect radio ground to terminal 5 (GND). (Do not connect telephone ground to this terminal.) Radio console equipment ground is negative.

- d. Connect the radio jack-sense lead to terminal 6 (JK. SENSE). This will signal the radio system that a handset is plugged into the override jackbox for standard handset usage.
- e. Connect the radio off-hook to terminal 7 (OFF-HK). This will signal the radio system that the telephone is off-hook on a line, and to switch the radio headset to the telephone.

1.14 Consoles come equipped with a 14-pin jack wired to a 10 ft. cable. This connector is compatible with a Motorola or similar type radio/telephone headset interface circuit. The transmit pair, receive pair, radio ground, jack-sense and off-hook leads are terminated in this connector as shown on drawing 830652-00205 Fig. 2C. The installer shall plug this connector into a compatibly wired plug as furnished by the radio manufacturer.

1.15 When the telephone panel is installed in conjunction with a radio system, the headset jackbox furnished by the radio manufacturer is the primary jackbox. The PEI jackbox is used as an override access to the telephone panel only, thus preempting the audio originating at the radio.

1.16 The installer shall mount the jackbox in a suitable location (usually under the console writing surface). To connect this jackbox (see drawing 830652-00205 Fig. 1) to a telephone panel used with a radio system, use the 6-wire modular to modular cord furnished, and plug this cord into the rear panel JACKBOX modular jack.

I. JACKBOX CONNECTIONS - WITH STANDARD (NON-RADIO) SYSTEM

1.17 The installer shall mount the jackbox in a suitable location (usually under the console writing surface). To connect this jackbox (see drawing 830652-00205 Fig. 3) to a standard (non-radio system) panel, use the 6-wire modular to spade-lug cord furnished, and connect the spade lugs to the miscellaneous terminal strip as shown on the drawing, 830652-00205 Fig. 2A.

J. HEADSET TRANSFER SUBSET - DESK-TOP CONSOLES

1.18 Connect the optional external headset transfer subset (850608-00101) to the HSXFR modular jack via a 6-wire modular cord. Refer to drawing 830652-00302 or 830652-00502.

K. SWITCH SETTINGS - POWER, RINGER, CMTR

1.19 Set the RINGER switch to LO-HI-OFF as desired.

1.20 Set the PWR switch to ON. This switch is factory set to OFF for shipment.

1.21 Factory setting of the CMTR (common T&R) switch is INT (internal). This switch is set to EXT (external) when the console common T&R are to be connected in series to external devices such as recorders, etc. via the CMTR modular jack.

L. TERM STRIP WIRING OPTIONS - FLUSH MOUNT PANELS

1.22 **JACKBOX TERMINAL STRIP:** This terminal strip is wired in parallel to the 6W modular JACKBOX jack, transmit pair, receive pair, and ground and relay control.

1.23 **HEADSET TRANSFER TERMINAL STRIP:** For radio connections, refer to Section H, "Jackbox Connections - With Radio System".

1.24 **MISCELLANEOUS T&R TERMINAL STRIP:** Refer to Section G, "Connections - External Device Located at the Console to Common T&R".

M. MANUAL SIGNALING

1.25 **LINE KEY CONVERSIONS:** Any group of 5 line keys on the console may be factory wired for manual signaling. Specify which group of lines are to be converted at the time of ordering the console. When a line is converted for this type of signaling, ground is momentarily applied to the "A" lead of a particular line only when the SIGNAL key is operated.

N. LAMP (LED) VOLTAGE OPTION

1.26 Consoles are normally furnished with 10VAC line LEDs. Systems providing a 24VDC backup battery used in the event of a commercial 120V power failure usually require the line LEDs to be 24VDC. Order consoles with 24VDC LEDs per Section 3-A, as required.

O. AUXILIARY (PTT) PORT OPTIONS

1.27 **DESK-TOP ONLY:** The auxiliary port, AUX (PTT) is located at the rear panel, which allows for headset and push-to-talk operations. This port is optioned-controlled by a five-position switch bank (SW3), (only switch positions 1-4 are used), located on the Orator board inside the console. AUX (PTT) port options are accessed by removing the left-end cap of the console. Options are selected by switch positions 1-4 of SW3. Refer to Figure 1 and Table B.

NOTE: Factory set to 603 mode unless requested otherwise.

P. GROUNDING INSTRUCTIONS

1.28 This telephone set is sensitive to electro static discharge (ESD). A ground wire is provided for the user to connect this set to a local earth ground. *Be sure to use it.* If not used, the installer or user might "zap" the internal electronics or memory dial. A convenient ground is found under the cover plate screw on a standard (3-wire) duplex outlet. Connect the ground wire from the set to the #6 binder head screw furnished with the set. Replace the oval head cover plate screw with this ground wire/screw. Test the ground. *Make sure it's reliable.*

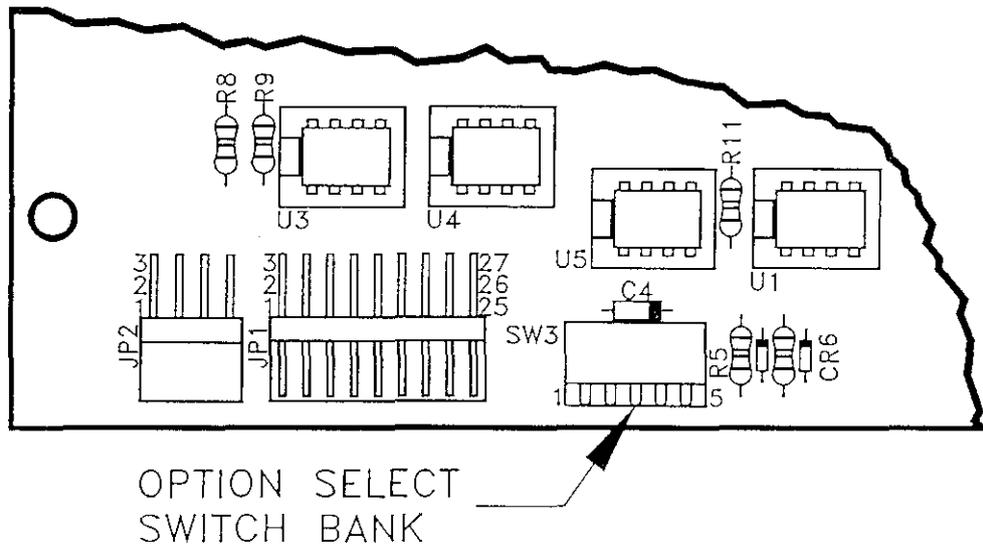


Figure 1 Option Select Switch Bank

TABLE B AUX (PTT) PORT OPTIONS					
	OPTION	SW1	SW2	SW3	SW4
TALK-PATH	Handset Port Cuts Off Auxiliary Port	Open	Open	N/A	N/A
	Handset Port Bridges Auxiliary Port	Close	Close	N/A	N/A
LISTEN-ONLY	Disable Listen-Only Speaker	N/A	N/A	Open	N/A
	Enable Listen Only Speaker	N/A	N/A	Close	N/A
603 MODE	Auxiliary port always enabled	Close	Close	Close	Close
HOOK-SWITCH RELEASE	Disable Hook-Switch Release	N/A	N/A	N/A	Open
	Enable Hook-Switch Release	N/A	N/A	N/A	Close

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SECTION II - CONSOLE OPERATING INSTRUCTIONS

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2.01 In the idle console condition, all line keys are normal (unoperated), and the red and green light-emitting-diodes (LEDs) on the **RELEASE** key are turned on. A handset or headset is plugged into the console, and the ringer and receive-speaker volume controls are adjusted as desired.

A. INCOMING CALL

2.02 An incoming call is indicated by:

- a. a flashing red LED on the line key at 60 interruptions-per-minute (IPM).
- b. an interrupted audible (tone ringer) signal.

B. INCOMING CALL - WITH OPTIONAL CALL SEQUENCER

2.03 Incoming calls are indicated by:

- a. a fluttering red LED on the line key at 330 IPM for the longest waiting incoming call.
- b. a flashing red LED on the line key at 60 IPM for all subsequent incoming calls.
- c. an interrupted audible (tone ringer) signal.

C. ANSWERING AN INCOMING CALL

2.04 To answer a call, momentarily press the flashing line key. The line key's red and green LEDs light steady, and the line is connected to the console. Only the red LED lights steady on other consoles.

D. ANSWERING AN INCOMING CALL WHEN USING THE OPTIONAL CALL SEQUENCER

2.05 To answer the longest waiting incoming call, press the fluttering line key. The red and green LEDs light steady, and the line is connected to the console.

2.06 To answer any call out of sequence, press the desired flashing line key. The red and green LEDs light steady, and the line is connected to the console.

E. HOLDING

2.07 To place a call on hold, momentarily press the **HOLD** key. The red LED changes from steady to a winking (120 IPM) indication, and the green LED goes out. All other consoles in the system will have a winking red LED on the line placed on hold.

2.08 You may now answer or originate another call. To re-enter the call on hold, press the winking line key. The winking red LED turns to a steady indication, and the green LED lights. Other consoles may enter a call on hold by pressing the winking line key.

F. HOLD RECALL (OPTIONAL)

2.09 When a call has been placed on hold for 60 seconds, the winking red LED will change to a fluttering (330 IPM) indication. An optional interrupted audible (tone ringer) will sound if wired and equipped by the installer to do so.

G. DISCONNECT

2.10 To disconnect a call, either replace the handset in its cradle on a desk-top console, or press the **RELEASE** key, or press another line key. The steady red and green LEDs will go out.

H. OUTGOING CALL - ON-HOOK DIALING

2.11 To place an outgoing call, press the desired line key. The red and green LEDs light steady. If the line is a dial line, you will hear dial tone. Dial the desired number. The dialed digits are displayed on the LCD display.

2.12 If the line is an automatic tie line, it will automatically signal the distant end.

2.13 If the line is a manually signaled tie line, momentarily press the **SIGNAL** key.

2.14 Desk-top consoles are arranged for "on-hook" dialing. You may dial a number without lifting the handset from the cradle. Dial tone will be heard through the loudspeaker. When the called party answers, lift the handset and talk.

I. THREE-WAY CONFERENCE

2.15 While talking on a line, you may wish to add another person to the conversation. If so, operate the **ADD-ON** key. The green LED lights. You may continue to talk to the original party. Press the line key of another line and dial, signal, etc. When the other party answers, you will have established a three-way conference. When the three-way conference is completed, operate the **ADD-ON** key again and also press the **RELEASE** key to completely reset the console.

2.16 To release the party you added to your original conversation, press the **ADD-ON** key. The green LED goes out. Press the original line key. You are now talking only to the original party. To disconnect the line, press the **RELEASE** key.

2.17 If you wish to have the party you added to the conversation remain and have the original party disconnected, press the **ADD-ON** key. The green LED goes out. Press the added party's line key. The original party is disconnected, and you are now talking only to the party added to the conversation. To disconnect the line, press the **RELEASE** key.

NOTE: When in **ADD-ON** mode, the release key will be inoperative.

J. SPEAKERPHONE OPERATION (OPTIONAL)

2.18 If your desk-top console is equipped with the optional speakerphone, to use it, you must first press any line key without lifting the handset from its cradle.

2.19 Dial in the usual manner. Audio will be heard from the loudspeaker.

2.20 Press the **SPKR** key. The green LED lights.

2.21 When the called party answers, you may talk (hands free) through the speakerphone. Optimum distance from the speakerphone is about 5 feet.

2.22 To disconnect, press the **SPKR** key. The green LED goes out, and the LEDs on the line key also go out.

2.23 To disable the speakerphone during conversation, lift the handset from the cradle and continue to talk. To resume speakerphone operation, return the handset to the cradle and talk hands-free.

2.24 To answer a call using the speakerphone, first press the **SPKR** key; then press the flashing line key.

K. MEMORY DIAL PROGRAMMING - DESK-TOP CONSOLES

2.25 To store a telephone number into memory, proceed as follows:

- a. Momentarily press any line key to hear dial tone.
- b. Press and *hold* **MEM** key.
- c. Dial one of 90 memory locations (00-89). The volume in the handset/speaker will lower to half volume.
- d. Continue by dialing the number to be stored, up to 18 digits. (e.g.) 01 19096764702
- e. Release the **MEM** key.
- f. Press the **RELEASE** key to disconnect.

2.26 Repeat Steps a-f in paragraph 2.25 for up to 90 telephone numbers.

2.27 Use the pull-out directory card to record your stored numbers (a soft pencil is recommended).

L. AUTOMATIC MEMORY DIAL PROGRAMMING - FLUSH-MOUNT UNITS

2.28 To store a telephone number into memory, proceed as follows:

- a. Momentarily press any line key to hear dial tone.
- b. Press and *hold* the MEM key.
- c. Press the key beside the keypad for the location of the number being stored.
- d. After you hear a click on the headset and/or speaker, dial the number to be stored, up to 18 digits. (e.g.) 19096764802.
- e. Release the MEM key.
- f. Press the RELEASE key to disconnect.

2.29 Repeat Steps a-f in paragraph 2.28 for up to 40 telephone numbers. In addition, address locations 40-89 may be programmed using a two-digit speed dial code. See paragraph 2.25.

M. MEMORY DIALING - DESK-TOP CONSOLES

2.30 Press the desired line key to obtain dial tone. Press the MEM key. Dial the two-digit address (00-89) for the pre-programmed number.

N. AUTOMATIC MEMORY DIALING - FLUSH-MOUNT UNITS

2.31 Press the desired line key to obtain dial tone. Select the number to be called by referring to the register by the keypad. Press the key along side the desired registered position.

O. LONG DISTANCE ACCESS (LDA) PAUSE OPERATION

2.32 If a pause between digits being stored in memory is required, press the LDA key once between these digits for each three-second pause required.

P. HOOKFLASH (HFL) OPERATION

2.33 Press the HFL key for Centrex transfer, 9-1-1 transfer, etc.. A 600 millisecond open occurs on the line regardless of the length of time the HFL key is pressed.

Q. LAST NUMBER REDIAL OPERATION

2.34 Press the RDL key to redial the last number manually dialed.

R. RECALL

2.35 Press the RECALL key to disconnect the line and re-seize dial tone on the operated line key. The line remains disconnected for as long as the key is pressed.

S. RINGER VOLUME CONTROL

2.36 Set the level of the tone ringer by adjusting the volume control switch on the rear of the console from low to high, as desired.

T. RECEIVE SPEAKER VOLUME CONTROL

2.37 Set the level of the receive-speaker by adjusting the volume control from low to high as desired.

U. DESK-TOP CONSOLE ANGLE ADJUSTMENT

2.38 Desk-top consoles have an adjustable base allowing a higher or lower setting. Squeeze the stand-up legs inward, and position the feet in one of the three sets of holes in the rear corners of the base for a high, medium or low setting.

V. HELPFUL OPERATING HINTS

2.39 Notify your maintenance technician if the green LED on the RELEASE key goes out. The power to the console is normal when both the red and green LEDs are turned on. If the green goes out and the red remains on, this indicates the console is operating on its built-in storage battery, which eventually will discharge, making the console inoperative.

2.40 Be sure to reset the console from the ADD-ON mode as described in paragraph 2.15, when you have completed a conference call.

2.41 If you unintentionally operated two line pickup keys, press the desired line pickup key, all other lines will automatically be released.