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AutoRemote

RADIO to TELEPHONE REMOTE UNIT

Model 6800

USER'S INSTRUCTION MANUAL

Made in U.S.A.

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GENERAL DESCRIPTION

The Model 6800 'AutoRemote' by Connect Systems Inc. is a fully automatic Multi-Mode Radio to Telephone Remote Unit. A built-in keyboard and digital display allow the user to obtain the maximum power from the on board microprocessor. All features are user programmable and/or selectable. There are four modes of operation to choose from...

1. Automatic VOX Simplex

For use with control station transceivers operating through repeaters, or straight simplex. Your conversation is fully automatic. Your voice turns on the transmitter. When you have finished speaking, the 6800 automatically returns your base station radio into receive so that you can hear the mobile response. Built-in Electronic Voice Delay prevents syllable clipping or word loss.

Manual Mode: If the phone is located in a severe noise environment, which hampers proper voice activated operation a simple command puts the 6800 into manual mode. In manual mode the phone party is in complete control. Simply press * to talk, # to listen. (Or, alternately T to talk, L to listen. This may be easier to remember).

2. Semi-Duplex

For use with duplex base stations or repeater base stations.

3. Repeater Controller

Converts any receiver and transmitter into a full featured repeater.

4. Telephone to Radio Paging Terminal

Beep Pagers and/or selectively call mobiles from any telephone.

And, powerful built-in standard features such as... 80 memory speed caller, store and forward touchtone signalling, remotely controllable relay, etc. make the 6800 the most versatile and powerful Radio to Telephone Unit on the market today!

Made and designed in the U.S.A.

INSTALLATION AND ADJUSTMENTS

The 6800 contains a COS interface circuit with COS input. This gives the 6800 a great deal of interface flexibility. The COS input can be connected to the carrier squelch, or to the CTCSS/DPL squelch for private activation. The audio takeoff point can be anywhere from the discriminator (pre-emphasized audio) to the volume control (de-emphasized or flat audio). In addition the Audio Out must be connected to the Mic input and the PTT Out to the radios' PTT line. Use shielded wires with the shields at both ends connected to chassis ground. (The rear panel barrier strip terminals labelled "GND" are chassis ground). We recommend using spade type crimp-on connectors for ease and reliability. Connect the center wires as follows:

AUDIO IN: The audio input terminal may be connected directly to the discriminator output, or to the high end of the volume control. If connecting to the discriminator, the de-emphasis strap JP-1 must be installed. If connecting to the volume control high side, JP-1 would be cut in most radios because the audio is already de-emphasized. However in the rare radio where de-emphasis is past the volume control, JP-1 must not be cut.

COS: The COS input can be connected to the noise squelch for carrier operation, or to the DPL/CTCSS squelch if you want the radios' built-in decoder to provide private operation.

Noise Squelch Connection: Connect to a point that has considerable voltage swing when the squelch is opened/closed. The best point to connect is to the collector of the transistor that controls the busy light (if the radio has one). Otherwise, connect to the squelch gate control voltage.

DPL or CTCSS Squelch: The receiver's DPL or CTCSS decoder will have a logic output that goes high or low when a properly encoded signal is received. Connect this point to the COS input.

If the COS input point you have selected goes low (i.e. from a positive reading to a less positive reading) when a signal is received it will be necessary to invert the COS for proper operation. COS inversion is accomplished in user programming area No. 1 on programming line 0.9.

When the COS threshold control P2 has been properly adjusted (described below), and the COS invert control properly programmed, the front panel RX LED will light when a signal is received. This condition is essential for proper operation of your AutoRemote.

AUDIO OUT: Connect to the Mic high line. If Mic loading occurs install a resistor in series with the Audio Out lead, and cut JP-3. The resistor should be large enough to prevent Mic loading but small enough to achieve adequate land to mobile audio. Try 100K as a first cut.

PTT: Connect to the base station PTT line.

MONITOR RELAY: The monitor relay is used to turn off the CTCSS or DPL built into the radio when any controlling phone goes off hook. This allows monitoring the channel before a call is made. A single pole double throw relay is provided for this purpose. Simply connect the W and NO or the W and NC contacts to the radios hook switch or monitor switch as appropriate.

POWER: Connect to a source of 12-14 VDC that can supply up to 300 MA. The 6800 is reverse polarity protected, so a polarity mistake will not damage your 6800. However the fuse will need to be replaced.

LINE: Connects to an unused CO input on your KSU, or to an unused station port on your PBX. Use an ordinary RJ-11 type modular phone cord.

#################### **WARNING** ####################

The 6800 contains a power source sensing circuit that continuously monitors the input supply voltage. An instantaneous drop below 11 VDC will cause a microcomputer reset. If the power supply has poor regulation, erratic operation may result.

The purpose of the input voltage sensor is to protect the non volatile EE memory during power up and power down.

If erratic operation occurs, be suspicious of poor regulation from the power supply.

##

ADJUSTMENTS

Initial settings: Set P1 fully counterclockwise. Set P2, P3, P5, P6, P7, P8, P9 and P11 to mid rotation. Set P4 fully clockwise. P10 is set for optimum EVD linearity at the factory and should not be adjusted (note wax seal which prevents accidental adjustment).

POT	PCB Name	Function
P1	**M->L:**	**Mobile to land level:** Initally adjust until mobile DTMF decodes as indicated on front panel DTMF LED. Later, adjust for proper mobile level as heard on telephone. Note: DTMF will not decode unless the RX LED is illuminated indicating that a signal is being received.
P2	**COS**	**COS Threshold level:** Measure the voltage at TP-1 with no signal. Then measure the voltage again with a signal applied. Adjust P-2 until the voltage reading at TP-2 is approximately midway between the two readings previously obtained at TP-1. For example: If TP-1 reads 2 volts with no signal, and 4 volts with a signal applied to the receiver, TP-2 would be set to read 3 volts. (TP-1 & TP-2 are near the COS pot) Important: If the COS invert/non-invert control (line 0.9. in user programming area No. 1) is properly set, and P2 properly adjusted, the RX LED will be illuminated when a signal is received. The RX LED should go out when the signal is removed.
P3	**TEL VOX:**	**Telephone VOX sensitivity:** Sets telephone VOX sensitivity for the automatic VOX mode. Adjust to suit. Mid rotation is about right for most applications.
P4	**RX VOX:**	**Receiver VOX sensitivity:** Used in the automatic VOX simplex mode only. Sets RX audio triggering sensitivity. Should be fully CW in VOX simplex applications. Reduce setting when used through repeaters or trunked systems if the phone cannot respond to mobile during hangtime due to noise or tone on the repeater's carrier.
P5	**L->M**	**Land to mobile level:** Adjust until audio from a phone provides normal transmitter modulation (deviation on a FM system). Cut JP-3 if required.
P6	**DTMF:**	**Phone to mobile DTMF level:** Sets the DTMF transmitter modulation level of phone to mobile DTMF, Mobile to Mobile DTMF and Semi-Duplex privacy beeps.

P7 BEEPS/CW ID: **Status beeps & CW ID level:** Adjust for desired modulation level of status beeps or CW ID.

P8 TONE SIGNALLING: **Tone signalling level to mobile:** Adjusts modulation level of optional signalling tones. (Not functional unless option 6802 has been installed).

P9 RING TO MOB: **Ring to mobile:** A ringback sound is heard in the mobile which lets the mobile know he is successfully ringing the base phones. P9 adjusts the modulation level of the ringing sound heard in the mobile while the 6800 is simultaneously ringing the office phone system.

P10 EVD BIAS **EVD Bias:** Adjusts the linearity of the EVD for minimum distortion. This is a factory adjustment and is normally not required in the field.

P11 RPT: **Repeat audio level:** Set for correct repeat audio level if repeater controller mode is selected (Pgm area No. 1 line 0.5.).

Note: The repeat audio level must be re-adjusted anytime the M->L control P1 has been adjusted.

JUMPER STRAP OPTIONS

JP-1 De-emphasis control. Factory Installed. Removal eliminates de-emphasis. De-emphasis is required if the 'Audio In' is connected to the discriminator. Cut JP-1 if connecting to the volume high.(Most Radios). JP-1 is adjacent to IC U-22.

JP-2 Factory installed. Should only be cut if option 6802 has been installed. JP-2 is between IC's U-18 & U-21.

JP-3 Audio output range strap. Strap in = low level (0-1 V). Strap removed = high level (0-5 V). Strap factory installed. JP-3 is between IC's U4 & U25.

EVD Center to 'IN' position for VOX Simplex Operation. Center to 'OUT' position for Duplex or Repeater Controller. The EVD jumper is factory strapped to the IN position. The EVD jumper is located adjacent to IC U-25.

PROGRAMMING THE 6800

The 6800 has three easily-accessed programming areas: Operating Parameters, CW ID and Speed-Calling Numbers. To enter one of the programming areas, turn the power off, press and hold the corresponding programming area button (No. 1 for Operating Parameters, No. 2 for CW ID or No. 3 for Speed-Calling Numbers) and simultaneously turn on the power. The display will show **0.x.**, where x is the number of the programming button that is being pressed. Release the button, and programming may begin.

Each programming area has the following features in common:

1) Programming line numbers are displayed with the dots illuminated on the displays. e.g. **0.1.**, **4.5.** etc.

2) Data values are displayed without the dots illuminated. e.g. **00**, **30**, etc.

3) Data is entered at a line number by pressing the desired digits followed by the **'P'** key. Consider the **'P'** key as the enter key.

4) The GOTO **A**ny **A**ddress line is displayed as **A.A.** This line is used to branch to any line number in the current programming area. For example, the current line is **A.A.** and you wish to goto line 21. Enter 2 1 P on the keypad and the display will read **2.1.**

5) Pressing only **P** at the **A.A.** line will advance the line to **0.1.** Pressing only **P** at any other line will advance to the next available programming line. NOTE: In CW ID and Auto-Dial Phone Number programming, the next line will be the next numeric line number. In Operating Parameters programming the next line is not necessarily the next numeric line (see the 'Programming the Operating Mode and Parameters' section).

6) To view the data at a given line number, briefly press **C** on the keypad and then release it. The display will then show the data for a few seconds and then re-display the current line number. Consider 'C' the data 'see' key.

7) At any point during programming, you may return to the **A.A.** line by holding down the **C** key until **A.A.** appears on the display (approximately three seconds).

PROGRAMMING THE OPERATING MODE AND PARAMETERS

(Programming Area No. 1)

To enter the parameter programming mode, press and hold button No. 1 on the internal keypad and then simultaneously turn on the power switch. At this point, the display will read 0.1. When you release the No. 1 button, you will see **A.A.**

A.A. (GOTO Any Address)

Press 'P' to start at line 0.1., or enter the line number you wish to go to and then press 'P'. All line numbers and their associated parameters are listed below starting with OPERATING MODE SELECTION.

Viewing or Changing Parameter Values

A quick tap on 'C' will reveal (for a moment) the currently selected parameter of the displayed program line. If the parameter is acceptable, press 'P' to advance to the next program line, or, enter a new parameter and press 'P' to advance to the next program line.

Parameter Checking

If an out of range parameter is entered (eg. 87 on line 0.3.) pressing 'P' will not cause an advance to the next program line. This prevents you from accidentally entering an unuseable choice.

Returning to A.A.

Programming is finished when you arrive back at A.A. If necessary, you can return to a previously programmed line by holding down 'C' for several seconds. This will return you to A.A. Now enter the line number you wish to return to and press 'P'. Line sequential programming will always flow forward from the current line.

Line numbers shown in braces e.g. [0.4.] indicates where programming will continue after a selection.

When you finish programming, simply turn the power off, and then back on to return to the operate mode.

OPERATING MODE SELECTION **[Branch to]**

0.1. Operating Mode

0 = VOX Simplex [0.2.]
1 = Semi-Duplex / Repeater Controller [0.4.]
DEFAULT: 0 = VOX Simplex

Note: Select choice No. 1 only if connecting to a system that can receive and transmit at the same time.

VOX MODE PARAMETERS

0.2. Pulser

0 = Disable
Select 1 - 99 (.1-9.9 Seconds)
.1 sec increments per step
DEFAULT: 0 = Disable

Used for compatibility with the GE GMARC trunking system. keeps the transmitter keyed at user programmed intervals if no one is

speaking. e.g. when on hold. This prevents the loss of your talk channel. Try a setting of 40 which will pulse every four seconds. Leave defaulted at zero if not operating through a GMARC trunked system.

0.3. RxVOX or Carrier Control

1 = RxVOX [0.9.]
0 = Carrier [0.9.]
DEFAULT: 1 = RxVOX

Select RxVOX for operation through remotely located repeaters. Select CARRIER for simplex operation only. In CARRIER, the telephone party cannot accidentally key the base transmitter while the mobile is talking.

SEMI-DUPLEX / REPEATER MODE PARAMETERS

0.4. Semi-Duplex Privacy Mode

1 = Enable
0 = Disable
DEFAULT: 0 = Disable

In privacy mode, the mobile side of the conversation is not re-transmitted. Thus eavesdroppers only hear one half of the conversation. Thus providing a good measure of privacy.

0.5. Repeater Controller

1 = Enable [0.6.]
0 = Disable [0.9.]
DEFAULT: 0 = Disable

1 - Selects Radio Remote Unit with Repeater controller.
0 - Selects Radio Remote Unit without Repeater controller.

0.6. Repeater Mode CW ID Interval

0 = Disable
Select 1-99 (.1-9.9 minutes)
.1 min increments per step
DEFAULT: 30 = 3 minutes

Choose the CW ID interval that you prefer for repeater mode or, disable repeater mode CW ID by pressing 0. The CW ID interval is equal to .1 minutes times the number entered.

0.7. Repeater Hang Time

Select 0-99 (0-9.9 seconds)
.1 sec increments per step
DEFAULT: 30 = 3.0 seconds

Selects the time in seconds that the repeater remains on the air after the input signal drops. The time is equal to .1 second times the number entered.

0.8. Repeater Activity Timer

0 = Disable
Select 10-99 (10-99 seconds)
1 sec increments per step
DEFAULT: 30 = 30 secs

Any single continuous mobile transmission exceeding the repeater activity timer limit puts the repeater off the air. The activity time in seconds is equal to the number entered. Pressing 0 disables the activity timer.

GENERAL OPERATING PARAMETERS

0.9. COS POLARITY

0 = Active Low
1 = Active High
DEFAULT: 1 = Active High

Allows reversing the polarity of the COS input in software. The front panel RX Led should light when a signal is received, and go out when the signal disappears. If your COS take-off point goes low (from a positive voltage to a less positive voltage) then change this line to a 0.

1.0. Mobile Activity Timer

0 = Disable
Select 10-99 (10-99 seconds)
1 sec increments per step
DEFAULT: 30 = 30 secs

Monitors mobile activity in Duplex mode. The transmitter automatically shuts down if the mobile is not heard from within the timed interval. The timer is reset each time the mobile transmits.

1.1. Telephone Remote Timeout Timer Time

0 = Disable
Select 1-99 (.5-49.5 minutes)
.5 minute increments per step
DEFAULT: 6 = 3 minutes

Select the maximum call limit time. The time is equal to .5 minutes (30 seconds) times the number you enter. This timer is resettable from the phone by pressing *. Upon timout, the transmitter is shut down automatically.

1.2. CW ID

1 = CW ID at off-hook and on-hook.
0 = CW ID at on-hook only.
DEFAULT: 0 = At on-hook only.

1.3. Aux. Relay

0 = Connect [1.5.]
1 = Telephone Control With Restore [1.5.]
2 = Telephone Control [1.5.]
3 = Key [1.5.]
4 = Remote Function [1.4.]
DEFAULT: 0 = Connect

NOTE: Option 6803 (Aux. Relay) required.

0. In connect mode, the relay is on whenever the phone is off hook.

1. In Telephone Control mode with restore, ** 1 will turn the relay off and ** 2 will turn the relay on. When the telephone goes back on-hook, the system will automatically return the relay to the off state. Useful for remote freq. 1, freq. 2 selection with automatic return to freq. 1 when the current call is completed.

2. In Telephone Control mode, ** 1 will turn the relay off and ** 2 will turn the relay on. The relay will stay in its present state until changed by the **1 or **2 command. Useful for remote freq. 1, freq. 2 selection but remaining where last commanded.

3. In key mode, the relay is on whenever the PTT is activated. This is useful where relay PTT keying is required.

4. A mobile Remote Function that provides a remotely controllable contact closure/opening which can only be activated if an access code is used. The access code is programmed on line 1.4. This mode cannot be operated from the phone side.

1.4. Remote Function Access Code

xxx = Any three digits
Protocol: #xxx relay ON
##xxx relay OFF
Default: 789

Sets the access code for the Mobile Remote Function. Select any three digits. To turn on the relay press #xxx. To turn off the relay press ##xxx. This functions only if you entered 4 on line 1.3. Note: The remote function can only be controlled from the mobile.

MOBILE_TO_BASE_CALLS

1.5. Click Calling

3 - 9 = No. of Clicks Req'd.
0 = Disable
Default: 0
Determines how many times the mobile must press (click) the Mic button to ring the phones at the office. Enter 0 if you only intend to ring the phones using touchtone from the mobile.

1.6. Mobile Access Code

0 = * (* only req'd)
x - xxxx (Protocol: * plus x's)
Default: 0 (* only required to ring the office phones)

This code is used to ring the phones at the office. Enter 0 if you only intend to ring the phones using Click Calling.

Note: Click Calling and Touchtone can both be used to ring the office phones if desired.

1.7. Ring Time

5-99 = .5 - 9.9 Seconds
Default 20 = 2 seconds

Sets the bell ringing time when a mobile calls the office. The time is equal to .1 times the number you enter.

1.8. Ring Dwell

5-99 = .5 - 9.9 seconds
Default 40 = 4 seconds

Sets the time between rings (dwell). The time is equal to .1 times the number you enter.

Note: The most common telephone cadence is two seconds ring, four seconds silence. Ring Time and Ring Dwell allow you to make incoming mobile calls sound different than incoming telephone calls.

1.9. Ring Number

1-99 = 1-99 Rings
Default = 4 Rings

Sets the maximum number of times the phones will ring if no one answers an incoming mobile call.

2.0. Overdial Timer

5 - 30 = Overdial time in seconds
0 = Disable
Default: 0 (Use for KSU operation)

Determines how many seconds are available for overdialing when a mobile rings a PBX. The time begins when the PBX self answers the call. The time is refreshed each time the mobile hits a digit. Overdialing is used to direct dial to a specific extention, and/or utilize specific PBX touchtone controllable features such as menu choices. 10 seconds is a reasonable choice. Note: Enter 0 if using AutoRemote on a KSU switch.

Do not set the time for longer than is actually required on your system, because the 6800 will not recognize touchtone from the phone until this timer has expired. This would prevent the phone side from sending commands to change to manual mode, change channels etc. at the very beginning of a mobile to base initiated call.

BASE TO MOBILE CALLS

2.1. Access Code No. 1

x-xxxx
0 = No Code required
Default: 0 = No code required

If a code is programmed, a phone cannot use the radio unless the code is entered from the phone. Enter 0 if you wish to have immediate access to the radio upon lifting the handset of an office phone.

Note: Unlike the mobile access code, * does not preceed the code. If you enter 456 on this line, then enter 456 from a phone to have access to the radio system.

2.2. Access Code No. 2

x-xxxx
0 = No Code Requiried
Default: 0 = No Code Requiried

Same function as the code programmed on line 2.1. However this code is intended to be used as a temporary access code for employees not requiring permanent access. This code can be changed as often as needs dictate.

Note: Unlike the mobile access code, * does not preceed the code. If you enter 6789 on this line, then enter 6789 from a phone to have access to the radio system.

2.3. Busy Channel Clear Time

0 = Disable
1 - 99 (.1 - 9.9 seconds)
.1 second increments per step
DEFAULT: 20 = 2 Seconds

Determines how long the channel must be clear of activity before a phone can make the radio transmit. A beep let's you know if the channel is clear to make your call. If the channel is busy you can listen in. The go ahead beep will sound after the channel is clear. In an emergency, you can override the channel clear timer for immediate access to the radio by pressing the * button on your phone. The time is equal to .1 times the number you enter.

2.4. Callout Code Sequence

0 - 80
0=Disable
Default: 0

The 6800 can automatically send any DTMF, CTCSS, 2 Tone or 5/6 Tone sequence automatically each time a phone initiates a call. This feature is useful to automatically activate a mobile or portable radio decoder. The number you enter here is an address used to look-up the tone type and sequence from the speed caller memory. Enter 0 if you do not require automatic tone signaling callout.

Note: The Speed Caller memory location specified must contain the desired tone type and sequence or the automatic Callout Code feature cannot operate.

TONE SIGNALLING (Option 6802 reqd for CTCSS, 2 Tone & 5/6 Tone)

2.5. Remote Speedcaller Programming Access Code

xxx = Any three digits
Default: 147

This is the access code that allows you to remotely program the 80 memory speed caller from any office phone. The protocol is #xxx. Please see page 18 for details about programming the Speed Caller.

2.6. Mobile to Mobile Signalling

1 = Enable
0 = Disable
Default: 0 - Disable

When enabled, the 6800 can convert a mobile initiated DTMF sequence into any of the optional tone formats for the purpose of selectively calling another mobile unit. See page 22 for details about using Mobile to Mobile Signalling.

2.7. Select Primary Tone (Option 6802 required)

0 = DTMF	[A.A.]
1 = CTCSS	[2.8.]
2 = Two Tone	[2.9.]
3 = Five/Six Tone	[3.0.]
4 = Expanded Two Tone	[2.9.]

DEFAULT: 0 = DTMF

If option 6802 is installed, all tones are available for use when using the Speed Caller. However for direct tone table access (CAP Code), only the tone type you specify here can be used.

2.8. CTCSS Beep Alert (Option 6802 required)

Select 0-9 (0-9 beeps)
DEFAULT: 6 = 6 Beeps
Select the number of alerting beeps that accompany the selected CTCSS tone for selective calling. See Table 2 for CTCSS selective call codes.

2.9. Two Tone Group Call or Diagonal Tone (Option 6802 required)
1 = Group Call
0 = Diagonal
DEFAULT: 1 = Group Call
NOTE: See Table 3 for Two Tone selective call codes.

3.0. Five Tone Preamble (Option 6802 required)
1 = Enable [3.1.]
0 = Disable [3.2.]
DEFAULT: 0 = Disable

Selects whether a preamble tone will preceed the 5 tone sequence. Select the selective call code and all appropriate 5/6 tone parameters from Table 4.

3.1. Preamble Tone
Select tone 0-9
DEFAULT: 0 = Tone 0

3.2. First Tone Select
Select tone 0-9
DEFAULT: 0 = Tone 0

3.3. Second Tone Select
Select tone 0-9
DEFAULT: 0 = Tone 0

3.4. Repeat Sequence
Select 1-9 (Repeat the tone sequence 1-9 times)
DEFAULT: 1 = Once

3.5. Duration of Tones
Select 1-99 (1-99 ms)
DEFAULT: 33 = 33 ms

3.6. Tone Group Select
1 = EIA [A.A.]
2 = ZVEI1 [A.A.]
3 = CCIR/EEA [A.A.]
4 = CCIT [A.A.]
5 = EURO [A.A.]
6 = ZVEI2 [A.A.]
DEFAULT: 1 = EIA (See Table 4)

3.7. Continuous CTCSS
1 = Enable
0 = Disable
DEFAULT: 0 = Disable

Important: If 3.7. is enabled, you must remove R26.

PROGRAMMING THE CW ID

(Programming Area No. 2)

To enter the CW ID programming mode, press and hold button No. 2 on the internal keypad and then simultaneously turn on the power switch. At this point, the display will read 0.2. When you release the No. 2 button, you will see **A.A.**

A.A. (GOTO Any Address)

Press 'P' to start at character position 0.1., or enter the character position number you wish to go to and then press 'P'.

Viewing Character Codes

A quick tap on 'C' will reveal (for a moment) the currently selected character code for the displayed character position. Press 'P' to advance to the next character position.

Returning to A.A.

If desired, you can return to a previously programmed character position by holding down 'C' for several seconds. This will return you to A.A. Now enter the character position (line number) you wish to return to and press 'P'.

PROGRAMMING

The CW ID message sent from the 6800 may consist of up to 15 characters. To program the message, enter the desired character codes (from Table 1 on next page) starting at character position **0.1.** thru the length of the string. If the message is less than 15 characters, it must be terminated with code 38 (Message End). For example, to program the CW ID message 'CSI':

0) Enter CW ID Programming Mode as explained above
   (Hold down key No. 2 and switch on the power)
1) From the **A.A.** line hit 'P'
2) From **0.1.** enter: ' 2 P' for the character "C"
3) From **0.2.** enter: '18 P' for the character "S"
4) From **0.3.** enter: ' 8 P' for the character "I"
5) From **0.4.** enter: '38 P' to end the message.
6) Turn off the power, and then back on, to return to operate mode with the newly programmed CW ID message.

If you do not want CW ID (morse code station callsign identification) simply enter 38 on line 0.1.

TABLE 1 CW ID CHARACTER CODES

A = 0	G = 6	M = 12	S = 18	Y = 24	5 = 30	WORD
B = 1	H = 7	N = 13	T = 19	Z = 25	6 = 31	SPACE= 36
C = 2	I = 8	O = 14	U = 20	1 = 26	7 = 32	
D = 3	J = 9	P = 15	V = 21	2 = 27	8 = 33	SLANT
E = 4	K = 10	Q = 16	W = 22	3 = 28	9 = 34	BAR = 37
F = 5	L = 11	R = 17	X = 23	4 = 29	0 = 35	
						MESSAGE
						STOP= 38

e.g. CW ID message desired is 'CSI' Enter 2, 18, 8, 38

SPEED CALLER PROGRAMMING

(Programming Area No.3)

To enter the speed caller number programming mode using the built-in keyboard, simply press and hold the No. 3 button on the internal keypad and then simultaneously turn on the power switch. At this point, the display will read 0.3. When you release the No. 3 button, you will see A.A.

A.A. (GOTO Any Address)

Press 'P' to start at speed call location 0.1., or enter the speed call location you wish to go to and then press 'P'.

Viewing or Changing Speed Call Data

A quick tap on 'C' will reveal the currently selected selective call code for the displayed speed caller memory location. The call code is displayed digit by digit until all digits in the current memory location have been shown. If the call code is acceptable, press 'P' to advance to the next memory location, or, enter a new call code and press 'P' to advance to the next location. Any memory can be disabled by entering four zeros. (0000P).

NOTE: If nothing is programmed at the current memory location, pressing 'C' will flash a '-' indicating that the current memory location is not programmed.

Returning to A.A.

If desired, you can return to a previously programmed memory location by holding down 'C' for several seconds until A.A. shows on the display. Now enter the speed call location you wish to return to and press 'P'.

Returning to Operate

To return to normal operation, switch off the power and then back on. You can now use your newly programmed speed call numbers!

ENTERING SPEED CALL DATA

Our concept of the speed caller for selective signalling is similar to an autodialer for a telephone. It allows abbreviated selective call codes and has the additional advantage that new call codes and/or tones can be temporarily substituted if someone is using a temporary radio or vehicle.

To program, start at any memory location 1 - 80 inclusive. (These appear on the display as 0.1. - 8.0.). The first digit entered should be the type of tone to use. Use this list...

0 = DTMF
1 = CTCSS
2 = Two Tone
3 = Five/Six Tone
4 = Expanded Two Tone

Then on the same line enter the selective call code. Here's some examples:

USER	MEMORY LOCATION	TONE TYPE	CALL CODE	DATA ENTERED
Bob	0.1.	2-Tone	587	2587
Mary	0.8.	5/6 Tone	295	3295
Joe	2.9.	DTMF	76349	076349

To selectively call Bob using the Speed Caller from a phone simply enter 1#. To call Mary enter 8#. To call Joe enter 29#.

PROGRAMMING THE SPEED CALLER FROM A PHONE

Occasionally it may be desirable to alter the Speed Caller memory from an office phone rather than going inside the 6800 to use the built-in keyboard and display.

First, pick up the handset of any plant phone and then enter the data as shown below. Be sure to begin with the # symbol, then enter the Remote Speedcaller Access Code which is user programmed on line 2.5. then enter the Memory No., Tone type and Call Code and finish with the * symbol. This lets the 6800 know that you are finished entering data. Use this protocol...

Access Code Memory No. Tone Type Call Code *

Access Code: As user programmed on line 2.5. of Pgm Area No. 1
Memory No. : Memory 01 - 80 as required. (See note below)
Tone Type : Per table above.
Call Code : As required.

Important: Memory locations 1-9 must be entered as 01 - 09.

For example: Using the example above, you wish to change Marys 5/6 Tone call code from 295 to 387. Assume that the remote access code is the default value of 147. Lift the handset of any office phone and enter the following digits: # 147 08 3 387 *. (Remember that Mary is in memory location No. 8).

Repeat this proceedure to add or modify as many call codes as desired.

Expanded Two-Tone: Normal two tone uses three digits. The first digit selects the group. The second and third digits select tones A and B from within that group. Expanded Two Tone is an exclusive CSI feature that allows you to use any two tones in the entire table. This scheme uses four digits. First digit specifies a group, the second digit selects the A tone from that group. The third digit specifies a different group, and the fourth digit selects the B tone from that group. Thus any tone combination is possible. See Table 3 For Two Tone data.

The expanded two tone can be entered into the Call Code field when programming the Speed Caller. Be sure to enter 4 in the tone type field. Expanded Two Tone may also be used directly for phone to mobile selective calling by entering xxxx*. Or even mobile to mobile using xxxx* from the mobile. (Must select choice 4 on line 2.7.)

OPERATION

The 6800 will display all DTMF digits on the internal display as they are decoded. This is a useful feature to make sure the Audio In and COS connections have been made properly.

NOTE: The DTMF digits * and # are shown on the internal display as a '|' and '||' respectively (same as 'p' and 'c'on the internal keypad). This is because the displays used can not display the * and # symbols.

PHONE TO MOBILE CALLS

KSU Systems: The 6800 must be plugged into an unused CO line input of the KSU. Let's assume you have plugged the 6800 into CO-3. Simply lift the handset of any phone and press the line 3 button. If the channel is clear and ready you will receive a go ahead beep. You can now engage mobiles in two-way communication.

PBX Systems: The 6800 must be plugged into an unused station port of the PBX. From any phone dial the appropriate station port. (Usually 8 or 9). If the channel is clear and ready you will receive a go ahead beep. You can now engage mobiles in two-way communication.

Busy channel clear timer: If the channel has activity, you will hear the activity but will be unable to key the transmitter until the current activity clears. Shortly after the activity clears you will hear the go-ahead beep. The Busy Channel Clear Timer go-ahead beep time is user programmable on line 2.3. In an emergency you can override the busy channel clear timer by pressing *. This will give you immediate access to the radio channel.

Access Codes: You can readily limit access to the radio by requiring an access code be entered from a phone prior to using the radio. The 6800 provides two user programmable access codes identical in function which can be programmed on lines 2.1. and 2.2. The second code can be used as a temporary code for temporary users which may be frequently changed. But leaving the regular code alone for use by those needing full time access to the radio.

Automatic Callout Code Sequence: The 6800 can automatically send any tone type and call code when a phone initiates a call. This is useful for automatic activation of attention getters such as horn honkers etc. The number entered on line 2.4. selects the corresponding memory location of the Speed Caller. The tone type and call code residing at that memory location will be used. See "Programming the Speed Caller" for details on speed caller set-up.

Selective Calling: You can selectively call mobile or portable units at any time from any in plant phone. You can send the tones manually, or you may use the speed caller for convenience. Remember that Touchtone signaling is a standard feature and that other tone types require Option 6802. Use this format...

Touchtone	x*	x = 1-5 digits any combination
CTCSS	xx*	xx See Table 2
Two Tone	xxx*	xxx See Table 3
5/6 Tone	xxx*	xxx See Table 4
Expanded Two Tone	xxxx*	See explanation page 19
Speed Caller	x# or xx#	x = Memory location 1-80

NOTE: x's as required

MOBILE TO BASE CALLS

The 6800 provides two methods for the mobile units to ring the phones at the base to initiate communications:

Click Calling: Mobiles and portables that are not equipped with touchtone pads can simply press their Mic buttons rhythmically at a rate of about one press per second 3-9 times as user programmed on line 1.5.

Touchtone: Mobiles and portables that are equipped with touchtone pads can enter the access code that has been user programmed on line 1.6.

The 6800 will ring the office phones until someone answers, or until the number of rings user programmed on line 1.9. has expired. Whichever occurs first.

KSU Systems: If the mobile has called a KSU system, all phones that are not in use will ring. The mobile call can be answered at any phone by simply pressing the appropriate line button. Exactly the same as answering an incoming telephone call.

PBX Systems: A PBX system receives a call from a mobile just as it would an incoming phone call. In an older system, an operator will probably answer and manually route the mobile to the desired extension. On newer systems, the mobile can overdial the desired extension, or make menu selections just as he would if calling into the PBX from an outside telephone. The mobile call is answered at the called extension in the same manner that an incoming phone call would be answered. The allowable time for overdialing must be user programmed on line 2.0.

If desired, the ring cadence (The amount of time a phone rings, and the amount of time between rings) can be customized to make incoming calls from the mobile and portable radios sound different than incoming phone calls. An unusual cadence will allow you to distinguish phone calls from mobile calls prior to observing the line lights on you phone. To customize the cadence, refer to user programming lines 1.7. and 1.8.

ADDITIONAL SYSTEM FEATURES

Telephone Remote Timeout Timer: Base to mobile communication will automatically terminate at the time you selected on line 1.1. Two quick beeps heard in succession every two seconds during the final twenty seconds warn that time out is imminent. The timeout timer can be reset from the phone by pressing *.

Mobile To Mobile Signaling: The 6800 will cross a mobile originated touchtone code of proper format to CTCSS, Two Tone or 5/6 Tone for the purpose of "waking up" another mobile, portable or pager. (Option 6802 is required for tones other than DTMF).

DTMF tones are stored and forwarded. This allows their use even in simplex operation.

If mobile to mobile signaling has been enabled (2.6.) simply send the same mobile selective call code that would be used from a phone.

Operation Through Repeaters or Trunked Systems:
(Only possible in the VOX mode)

Operating the 6800 through a repeater appears to the user as straight simplex operation. It makes no difference if the repeater is DPL/CTCSS or carrier activated, or if the repeater has hang time. Actually, three or four seconds of hang time will improve operation because there will be fewer noises to distract the conversation.

The .5 second electronic voice delay option is highly recommended when using AutoRemote through repeaters to eliminate any possibility of word clipping or loss.

NOTE: See comments on setting the RX VOX control on page 6.

Using the Repeater Controller:
If desired, the built-in repeater controller (sometimes called a repeater maker) can be enabled if the AutoRemote is connected to a duplex receiver and transmitter. Program lines 0.5. through 0.8. allow you to customize the repeater operation for your use. Note that the repeater controller is disabled when a phone goes off hook to use the radio.

SUMMARY OF CONTROL COMMANDS

From any plant phone:

To override Busy Channel Clear Timer *
(To barge in on top of existing communications)

Access code 1 x-xxxx x = 1-4 digits
Access code 2 x-xxxx x = 1-4 digits
(Only if access codes were programmed on lines 2.1. or 2.2.)

Aux. Relay off (freq. 1) **1
Aux. Relay on (freq. 2) **2
(1.3. must be programmed as 1 or 2)

Change from VOX Mode to Manual Mode **M
Change from Manual Mode Back to VOX Mode **V

To Talk when in Manual Mode * or T
To Listen when in Manual Mode # or L

To selectively call a mobile using...

Touchtone	x*	x = 1-5 digits any combination
CTCSS	xx*	xx See Table 2
Two Tone	xxx*	xxx See Table 3
5/6 Tone	xxx*	xxx See Table 4
Expanded Two Tone	xxxx*	See explanation page 19
Speed Caller	x# or xx#	x = Memory location 1-80

NOTE: x's as required

From the mobile:

To ring the office phones * or *x x = 1-4 digits
(Only if a code was programmed on line 1.6.)

Aux. Relay Remote Function ON #xxx NOTE: Must have selected
Aux. Relay Remote Function OFF ##xxx 4 on line 1.3.
(x's programmed on line 1.4.)

To selectively call another mobile...

Touchtone	x*	x = 1-5 digits any combination
CTCSS	xx*	xx See Table 2
Two Tone	xxx*	xxx See Table 3
5/6 Tone	xxx*	xxx See Table 4
Expanded Two Tone	xxxx*	See explanation page 19
Speed Caller	x# or xx#	x = Memory location 1-80

NOTE: x's as required

OPTIONAL TONE SIGNALLING TONES
(Option 6802)

CTCSS SELECTION TABLE								
FREQ	**CODE**	**SELECT**	**FREQ**	**CODE**	**SELECT**	**FREQ**	**CODE**	**SELECT**
67.0	XZ	10	107.2	1B	23	167.9	6Z	36
71.9	XZ	11	110.9	2Z	24	173.8	6A	37
74.4	WA	12	114.8	2Z	25	179.9	6B	38
77.0	XB	13	118.8	2B	26	186.2	7Z	39
79.7	SP	14	123.0	3Z	27	192.8	7Z	40
82.5	YZ	15	127.3	3A	28	203.5	M1	41
85.4	YA	16	131.8	3B	29	210.7		42
88.5	YB	17	136.5	4Z	30	218.1		43
91.5	ZZ	18	141.3	4A	31	225.7		44
94.8	ZA	19	146.2	4B	32	233.6		45
97.4	ZB	20	151.4	5Z	33	241.8		46
100.0	1Z	21	156.7	5A	34	250.3		47
103.5	1A	22	162.2	5B	35			

TABLE 2

CTCSS SELECTIVE CALL CODES

The CTCSS selective call code digits (10-47) define all 38 EIA standard CTCSS tones. To find the call code for a specific CTCSS frequency, locate the frequency in Table 2. The two digit call code is found adjacent in the select column.

Example: The call code required to signal 131.8 Hz. is: 29

TWO TONE GROUP SELECTION TABLE										
1st digit	0	1	2	3	4	5	6	7	8	9
2nd & 3rd digit	MOT GPA	MOT GP1	MOT GP2	MOT GP3	MOT GP4	MOT GP5	MOT GP6	MOT GPA	MOT GPB	MOT GPC
0	358.9	330.5	569.1	1092.4	321.7	553.9	1122.5	682.5	652.5	667.5
1	398.1	349.0	600.9	288.5	339.6	584.8	1153.4	592.5	607.5	712.5
2	441.6	368.5	634.5	296.5	358.6	617.4	1185.2	757.5	787.5	772.5
3	489.8	389.0	669.9	304.7	378.6	651.9	1217.8	802.5	832.5	817.5
4	543.3	410.8	707.3	313.0	399.8	688.3	1251.4	847.5	877.5	862.5
5	602.6	433.7	746.8	953.7	422.1	726.8	1285.8	892.5	922.5	907.5
6	688.3	457.9	788.5	979.9	445.7	767.4	1321.2	937.5	967.5	952.5
7	741.3	483.5	832.5	1006.9	470.5	810.2	1357.6	547.5	517.5	532.5
8	822.2	510.5	879.0	1034.7	496.8	855.5	1395.0	727.5	562.5	577.5
9	912.0	539.0	928.1	1063.2	524.6	903.2	1433.4	637.5	697.5	622.5
DG	569.1	569.1	979.9	569.1	569.1	979.9	979.9	742.5	742.5	742.5

TABLE 3

TWO TONE SEQUENTIAL CALL CODES

A 1000 call two tone sequential sequence consists of three digits. The first digit selects the group. The second and third digits select tone A and tone B from that group.

For example: The selective call code required to generate tone A = 296.5 and tone B = 1006.9 would be: 327.

Note: Tone duration: Tone A = 1sec, tone B = 3sec.

See page 20 'Expanded Two Tone' for column mix tone combinations.

5/6 TONE SELECTION TABLE						
SELECT #	1	2	3	4	5	6
TONE #	EIA	ZVEM	CCIR/ EEA	CCIT	EURO	ZVE12
0	600	2400	1981	400	980	240
1	741	1060	1124	697	903	1060
2	882	1160	1197	770	833	1160
3	1023	1270	1275	852	767	1270
4	1164	1400	1358	941	707	1400
5	1305	1530	1446	1209	652	1530
6	1446	1670	1540	1336	601	1670
7	1587	1830	1640	1477	554	1830
8	1728	2000	1747	1633	511	2000
9	1869	2200	1860	1800	471	2200
R	459	2600	2110	2300	1063	970

TABLE 4

5/6 TONE SEQUENTIAL CODES

Select one of the five tone groups from the table above and enter on (3.6.)

The first two tones of a 1000 call five tone sequence are selected from the appropriate group and entered on (3.2.) and (3.3.) These two tones will automatically be sent with each page.

The third, fourth and fifth tones of the five tone sequence become the selective call code and are selected under the chosen operating group.

Example: A pager sequence of 1023, 1305, 1587, 741 and 1446 HZ is required. Enter 1 (EIA) on line 3.6. Enter 3 on line 3.2. Enter 5 on line 3.3. The three digit selective call code is then = 716.

To increase the probability of successful signaling, the five tones can be automatically repeated up to nine times (3.4.).

A sixth preamble tone can be enabled (3.0.) and selected (3.1.) if required.

The desired tone duration can also be selected (3.5.)

TYPICAL APPLICATIONS FOR THE AUXILIARY RELAY
(Option 6803)

Remote Channel 1 Channel 2 Selection: The operating channel of the remotely controlled base station radio can be switched from the controlling phone.

Select choice 1 on line 1.3. if you want the radio to automatically revert to channel 1 when your current call is finished. Select choice 2 if you would prefer that the selected channel not change until a new command is sent.

The command **1 turns the relay off. **2 turns the relay on. Connect W and NO or W and NC to the radio to as appropriate to affect the required channel change.

Relay Switched PTT: If the radio's unkeyed PTT voltage exceeds 16 VDC or if inverted keying is required (closure to 12V) the auxiliary relay must be used to key the transmitter.

Enter 3 (KEY) on line 1.3. Connect the radio's PTT line to the W terminal of the Aux. Relay terminal strip. Connect the NO terminal to 12 VDC for inverted keying or to GND for standard sink to ground keying. The PTT connection on the rear barrier strip should not be connected.

Remote Relay Function: In some installations it may be desirable to remotely control (switch) something from the mobile. e.g. change channels, change CTCSS tones, change antennas etc.

Enter 4 (REMOTE FUNCTION) on line 1.3. Then select a three digit control code on line 1.4. If the code selected was 789, you would turn on the relay by sending #789. To turn off the relay send ##789. The remote function is designed for use from the mobile only.

CONNECTING THE RELAY

Connect the device requiring remote control to two of the three terminals labeled 'AUX. RELAY' on the rear panel barrier block. Always use the W terminal and then select NO (normally open) or NC (normally closed) as is appropriate.

LIMITED WARRANTY

Connect Systems Inc. (CSI) hereby warrants our products to be free from defective workmanship for a period of one year and defective parts for a period of five years from date of sale to the initial end user. This warranty applies only to the original consumer/end user purchaser of each CSI product. During the first year of warranty, CSI will repair any of its products at no charge providing the defective unit is shipped prepaid and service is performed by CSI. During the years 2 -5, there shall be no charge for replacement parts providing that the defective unit is shipped prepaid and service is performed by CSI. Conventional prevailing labor and shipping charges will apply following the end of the first year. CSI, at its sole discretion, will replace defective parts on an exchange basis for the first five years of ownership by the original purchaser. All shipping cost are the responsibility of the customer.

What is not covered by this limited warranty:

This warranty shall not apply, if, in our judgment the defects are caused by misuse, lightning strikes, customer modification, water damage, negligent use, improper installation, overloads caused by external voltage fluctuations, use of unregulated power supply, damage caused by transit or handling or an abusive treatment not in accordance with ordinary product use or the product serial number has bee removed, altered, or defaced. **Specific Exclusion:** This warranty specifically excludes lightning protection devices (MOVs and phone line fuses) and transistors in the PTT (Push to Talk) circuitry. These components can only fail from external abuse.

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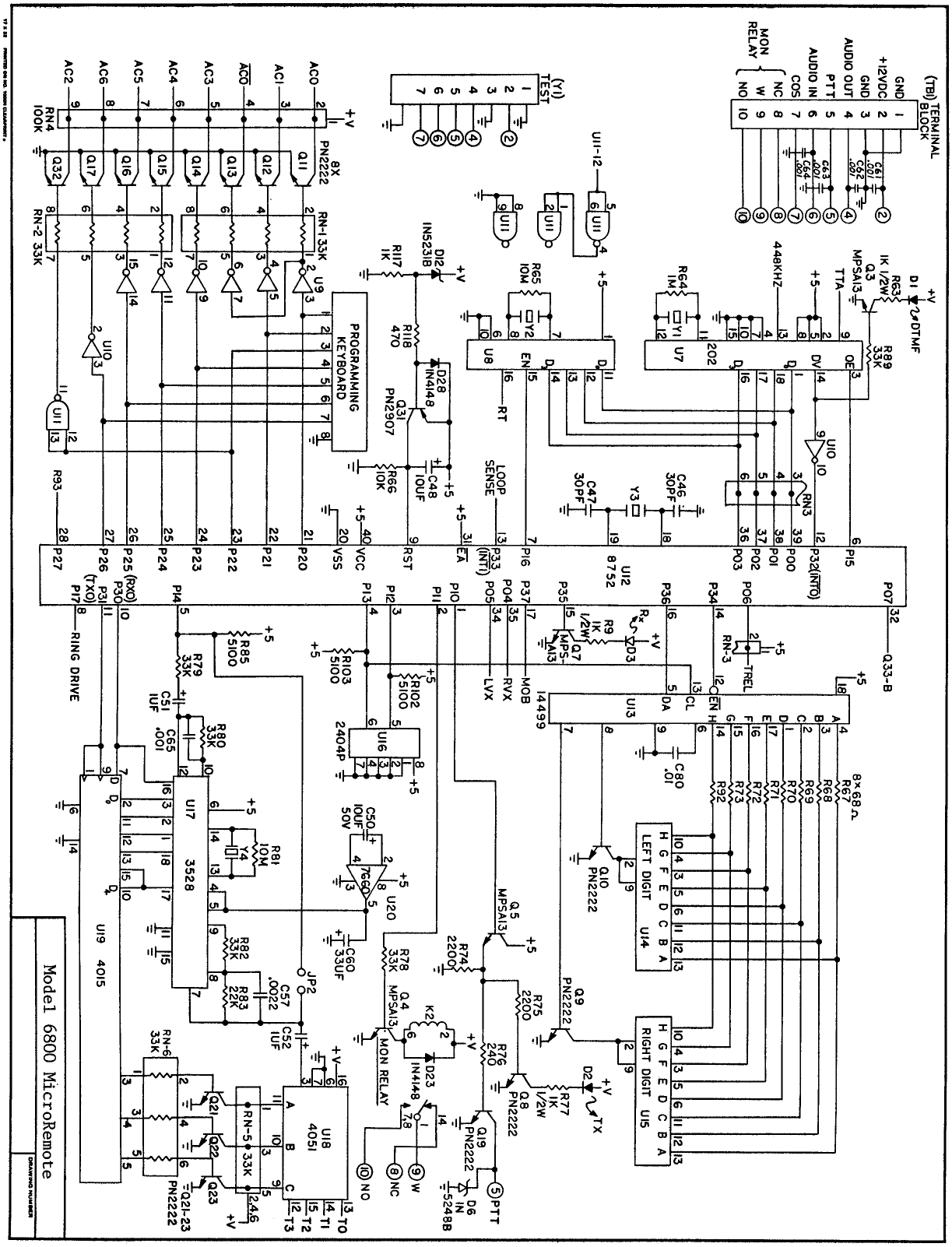
If your new CSI product shall ever fail, contact Connect Systems Inc. Customer Service Dept. for repair and warranty information at (805) 642-7184

Note: Connect Systems Inc. reserves the right to render a modest service charge when returned units are found to be free of parts or workmanship defect(s) (i.e. operating to factory specification) within the first year of warranty. Such units will be returned freight collect to the sender, including the appropriate service charge.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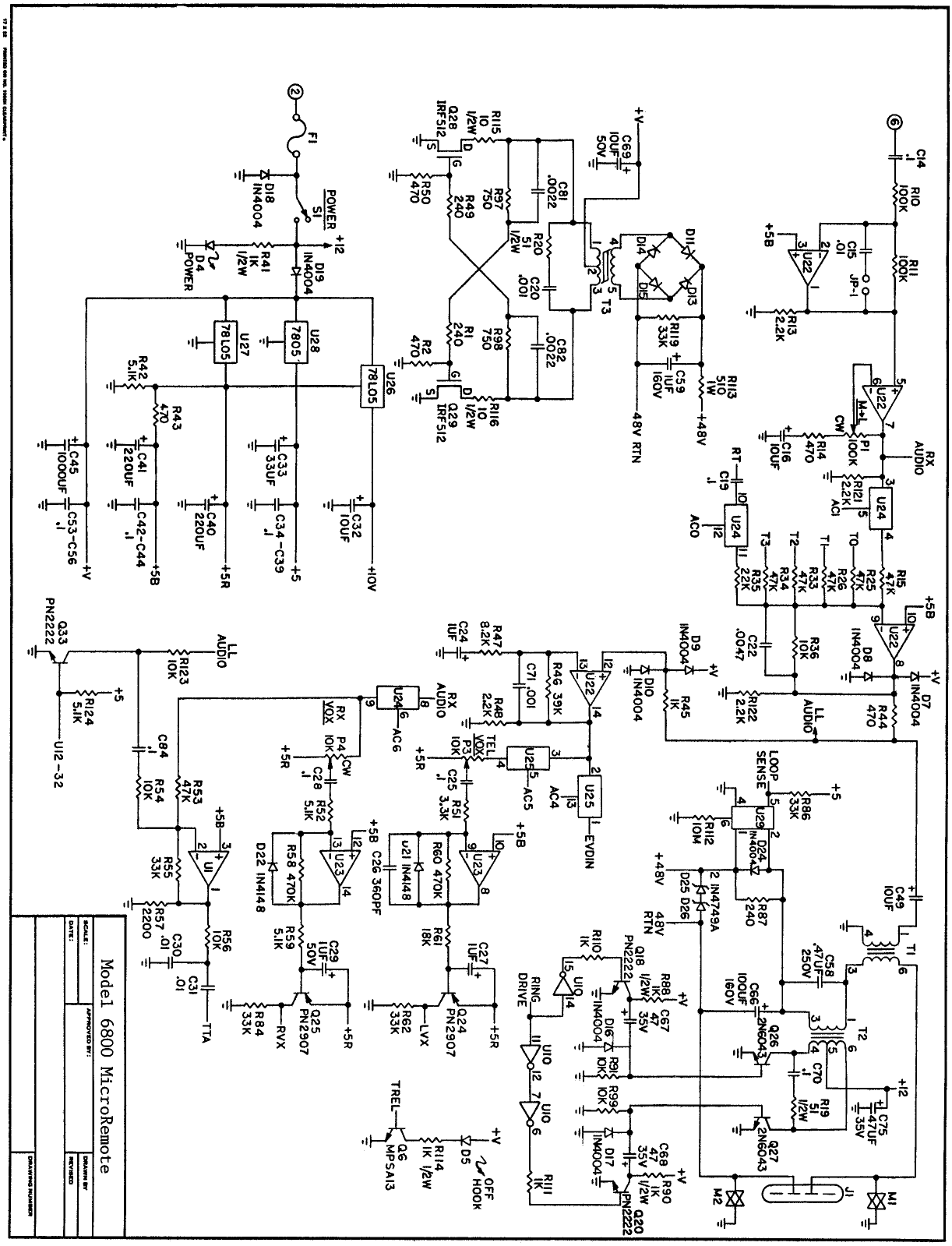
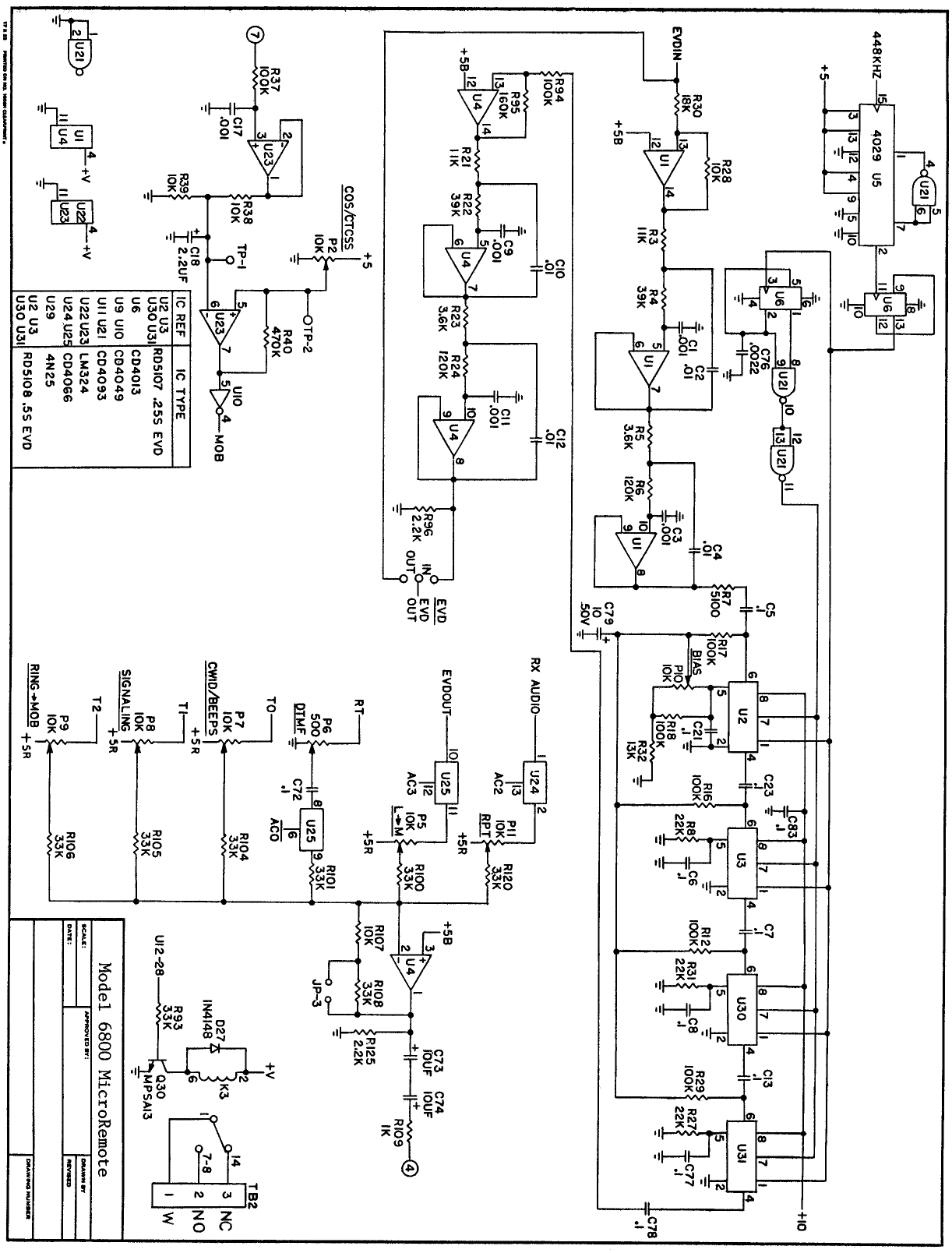

Model 6800 MicroRemote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