

SSC

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MODEL 832A/B

OPERATING INSTRUCTIONS
TONE REMOTE ADAPTERS
(Industry Std. 4 Tone Format)
MODELS: 832A Series (Simplex)
832B Series (Duplex)

Rev: 6/87

I. GENERAL

Models 832 A and B series are devices intended to be attached to any fixed location base two way radio station for the purpose of interfacing distant corresponding models 831 A or B series or other industry standard formatted Tone Remote Controls. The transmission path medium between these units may include leased point-to-point telephone line, microwave MUX channel, UHF link, fiber optic line or earth satellite relay. The basic P.C. Board used in both model series contains separate receive and transmit audio path amplifiers. A keying tone notch filter prevents the 2175Hz tone from being transmitted by the base station. In simplex systems, the notch filter is switched into the receive path to prevent possible 2175Hz interference from other stations. Band pass amplifiers, tone signal compressor, tone detection, timing, interlocking logic and keying circuits are provided to decode the command signals which remote control the base radio station operating functions. The first suffix letter in the full 832 Model designation indicates the electrical configuration. The second suffix letter indicates the mechanical mounting configuration.

II. SPECIFICATIONS

ELECTRICAL (All Models)

DC Supply Voltage: 11 VDC to 16 VDC (filtered)
DC Supply Current: 110mA nom. stand-by, 225mA max. maximum depending on model.
Alternative AC Voltage: 117VAC (optional supply)
Telephone Line IN-OUT Impedance: 600ohms nom. balanced.

Output to Phone Line: Adjustable up to +10dBm
Line Drive Distortion: Less than 1% at 0dBm
Input from Phone Line: -45dBm min. to +10dBm max.
Output Audio to Transmitter: Adjustable up to 1.5VRMS from 100 ohms source (w/-10dBm input).
Transmit Audio BandPass: Within 3dB from 300Hz to 3300Hz except for 2175Hz notch.

Transmitter Keying: By 2 form "C" contacts.
Input Audio from Receiver: 30mVRMS min. across 10K load impedance for 0dBm telephone line drive, adjustable.

Notch Filter: At least 40dB notch at 2175Hz PTT tone in audio path to radio transmitter. Also switched to received audio in simplex models.
Simplex Operation: Notch Filter and audio path is solid state switched and controlled by receipt of 2175Hz Guard Tone and held by PTT Tone.

Duplex Operation: Notch Filter is dedicated to TX audio path - no audio path switching.
Control Tone Frequencies: Guard and PTT: 2175Hz on all models.

Monitor: 2050Hz, F1: 1950Hz, F2: 1850Hz on models 832A and 832B only.

Relative Tone Levels: Dependent on model designation (see below). All tone dB levels are relative to constant peak voice as received via telephone line from tone remote control.

Monitor Function: A wide variety of field strapping options are provided for control of the monitor operation. 2 form "C" contacts are provided for interfacing with radio.

F1-F2 Select: 2 form "C" contacts are provided for interfacing with the radio frequency select circuit. The F1-F2 select may be used to enable/disable in a repeater station.

Indicators: Each function output is equipped with an amber LED mounted on the P.C. Board to indicate the current condition of the control function.

Operating Environment: Fixed, -40°C to +85°C, 95% RH, non-condensing

MODEL 832A Series

Operation: Simplex (2 wire)

Number of Tones: Four

Tone Format: 130ms of 2175Hz Guard Tone at +10dB relative, followed by 45ms of either 2050Hz, or 1950Hz or 1850Hz at 0dB relative, followed by 2175Hz PTT Tone at -20dB relative.

Compatibility: SSC Model 831AY and other industry standard 2 channel, tone monitor and TX keying tone remote controls.

MODEL 832B Series

Operation: Duplex (4 wire)

Number of Tones: Four

Tone Format: Same as 832A

Compatibility: SSC Model 831BY and other industry standard 2 channel, tone monitor and TX keying full duplex tone remotes.

MECHANICAL (All 832Models)

Interface Connections: Via screw clamp type terminals.
Dimensions by Second Suffix Designation:

"A" P.C. Board only: 9 1/2" L x 3 3/4" W x 1" H

"Y" Enclosure Size: 10" L x 4" W x 2 1/2" H

"X" Rack Panel Mount: 19"W x 5 1/4" H x 1 1/2" D

"W" Enclosure Mounted on Rack Panel.

III. MOUNTING CONSIDERATIONS

Although the 832 Series is RFI hardened, care should be taken when choosing a mounting place so that the unit is not exposed to high levels of RF as would be found in the final power amplifier compartment or next to the antenna lead when there is high V.S.W.R.

If the "A" P.C. Board version has been ordered, it is suggested that the unit be mounted using 4 each #4-32 screws and stand-offs within some sort of enclosure near but not in the base radio transmitter RF enclosure. Final placement of the 832 adapter should be planned so that the leads between it and the associated radio equipment are short but convenient. The transmitter audio input lead may have to be shielded if hum or RFI pickup is a problem.

In all cases, protect the 832 from water and condensation as performance will be affected.

IV. STRAPPING AND OPTIONS

Monitor Function Strapping Options:

The tone squelch monitor function can be strapped for various operating modes as determined by jumpers JU-1 through JU-4. The table on the attached assembly drawing describes the different configurations possible. The 832 unit is factory supplied strapped for mode "A" as indicated in the table.

NOTE: If both JU-1 and JU-2 are connected the PTT will stay latched at all times.

Optional Power Supply: A 12 Volt regulated power supply for the 832 is available from SSC in the event the base station cannot supply filtered but unregulated 12VDC, negative ground, 250mA.

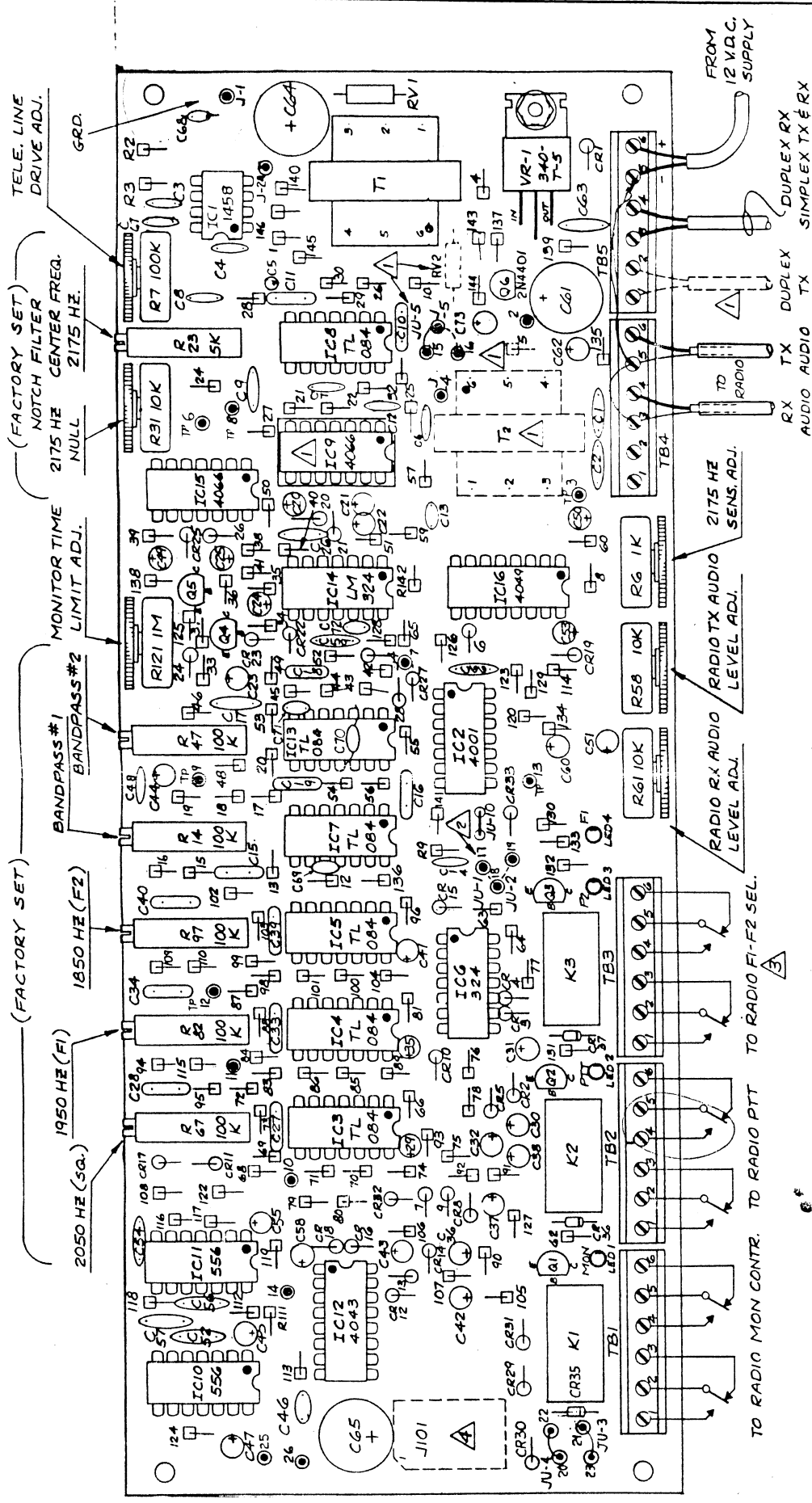
V. INSTALLATION AND ADJUSTMENTS

NOTE: It is a prudent good idea to bench test the 832 with the associated Tone Remote Controls before installing the units in the field. Operation of the Tone Remote Adapter relays can be checked visually using the LED's mounted on the P.C. Board. Refer to the assembly, schematic and block diagram drawings on this instruction sheet for the locations of the input-output terminals, adjustments and indicator LED's.

It is assumed that the associated Tone Remote Controls have been adjusted according to the published specifications before this procedure is performed. The 2175Hz burst tone should be set for 130ms. at +10dBm with voice limited to 0dBm peak. Function tones should be 45 to 50 ms long at a relative 0dB with the PTT holding tone at a relative -20dB. The SSC factory presets each Model 832A and B Tone Remote Adapter to operate with the above signals from corresponding Tone Remote Controls. In so much as each base radio station interfaces at different RX and TX audio levels, these levels and the 2175Hz sensitivity will have to be adjusted when the adapter is installed at the final location with the losses of the interconnecting phone line or other medium in the path.

In addition to checking the response to commands from the remote controls, the bench test provides a good opportunity to check the monitor function timing and operation according to the customer's requirements. See note 2 on the assembly drawing for a chart of field options. Adjust "MONITOR TIME LIMIT", R121 as required for desired automatic reset.

Following the preliminary bench test, install the 832 A or B unit as planned at the base radio station and connect the tone remote controls at the far end of the interconnect line or circuit path. Use a dummy load on the transmitter during testing. Interconnect line loss test: With a steady 2175Hz Burst Tone set for +10dBm at the remote control end, measure the level at the 832 adapter end. The loss should not be more than 20dB for the system to operate in a fail-safe manner. With more than 20dB loss, the system can fail if the noise squelch stays open.



- NOTES:
- ⊖ INDICATES DIODE WITH BAND UP
 - RESISTORS
 - ⊕ TP / PIN JACK
 - ⊕ CAPACITORS, POS. POLARITY SHOWN
 - ⊖ TYP. DISC CAPACITOR
 - ⊖ COG. CAPACITOR
 - ⚠ FOR 832 BA, ADD T2, RV2, R5, AND CONNECT JU-5 BETWEEN J-16 & J-5. DELETE IC9, ADD HEADR WITH JUMPERS AS SHOWN.
- TO REMOTE CONTROL VIA PHONE LINE
- ALUM. ELECT. TANT.
- TO RADIO MON CONTR. TO RADIO PTT TO RADIO FI-F2 SEL.
- RADIO RX AUDIO LEVEL ADJ.
- RADIO TX AUDIO LEVEL ADJ.
- 2175 HZ SENS. ADJ.
- TO RADIO
- RX TX DUPLEX
- AUDIO AUDIO TX TX DUPLEX
- FROM 12 V.D.C. SUPPLY

MONITOR FUNCTION STRAPPING OPTIONS:

MODE	JU-1	JU-2	JU-3	JU-4	OPERATION & NOTES
A	OUT	OUT	IN	IN	(SUPPLIED) TIMED PTT ALSO KEYS MON, RST AT END OF PTT
B	OUT	OUT	IN	IN	PTT KEYS MON. INDEPENDENT OF TIMER
C	IN	OUT	IN	IN	LATCHED MON. RST AT END OF PTT
D	OUT	IN	OUT	IN	MON. TIME REFRESHED BY PTT
E	IN	OUT	IN	OUT	LATCHED MON. RST AT START OF PTT
F	OUT	OUT	IN	OUT	MON. TIME RST AT START OF PTT

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REVISIONS

1. 11/15/74

2. 1/10/75

3. 1/10/75

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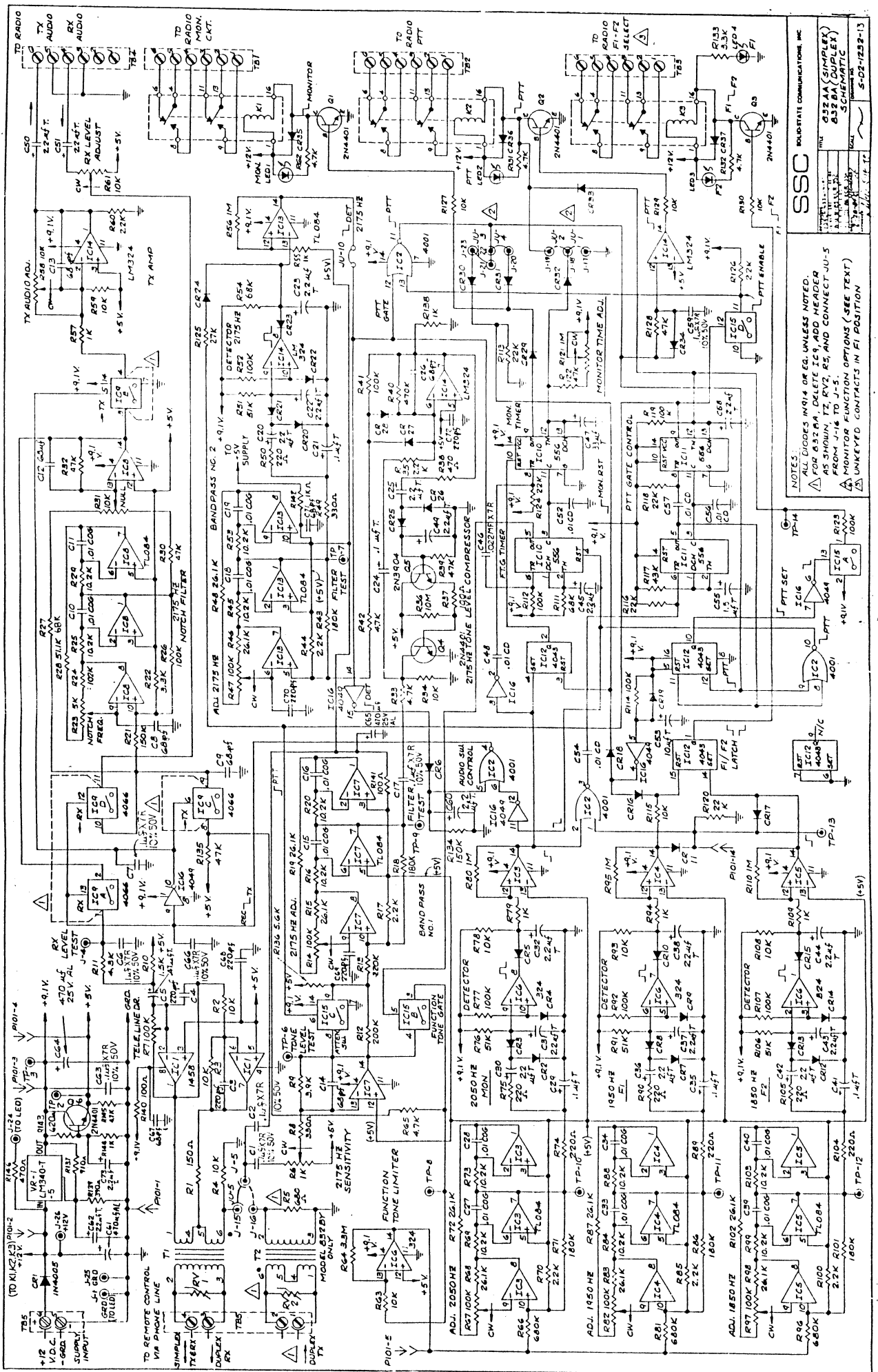
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MODEL 832 AA/BA

PC BOARD ASSEMBLY

DRAWING NO. A-C2-1240-T

- UNKEYED CONTACTS IN FI POSITION FOR FUTURE EXPANSION



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NOTES:
 ALL DIODES IN Q14 OR EQ, UNLESS NOTED.
 FOR Q32 AA, DELETE IC9, ADD HEADER AS SHOWN IN R2, R22, R5, AND CONNECT J-5 FROM J-16 TO J-5.
 MONITOR FUNCTION OPTIONS (SEE TEXT)
 UNKEYED CONTACTS IN FI POSITION

Q32 AA (SIMPLEX)
 Q32 BA (DUPLEX)
 SCHEMATIC

REV. 5-14-72
 5-02-1232-13

2175Hz Sensitivity Adjust: With the same +10dBm 2175Hz tone described above, adjust R6 for a level of 2VRMS at TP-6 with ground at TP-1. Remove the tone, then have someone at the remote control end test all of the command functions. Observe the LED's on the 832 for correct indications.

Radio RX Level Adjust: Disable the radio receiver tone and noise squelch to produce white noise. Adjust the radio receiver audio output for approx. 1VRMS at input to the 832 across pins 4 and 5 of TB-4. Then adjust R61 for a level of 0.4VRMS at TP-4 with reference ground at TP-1.

Telephone Line Drive Adjust: After the above adjustment and with the white noise still present, adjust R7 for approx. 1VRMS (0dBm) across the interconnecting telephone line for the RX signal. Remove noise by returning to receiver squelch operation.

Radio TX Audio Level Adjust: Set up to test transmitter output deviation with a dummy load and station modulation monitor. Have someone at the tone remote control press to talk and sound a constant "00000" into the microphone of the handset. Adjust R58 for full undistorted modulation of the transmitter as measured on the modulation monitor.

Following the above steps, connect an antenna to the base radio station and make a test radio contact with a field or other unit using the remote control. Check all operating functions and for quality of speech. Over drive into the phone line or transmitter can cause distortion.

VI. MAINTENANCE AND TROUBLE SHOOTING:

The 832 Series Tone Remote Adapter is designed to operate within a 20dB variation in command signal levels. However, if the interconnect telephone line loss varies more than about 6 to 10dB, deterioration in speech levels and quality may be noticed. A routine periodic check of the line loss and 2175Hz sensitivity according to section V above would be a good idea. Make appropriate adjustments as required. If control problems are encountered, check the timing and relative tone levels at the Tone Remote Control first. The sequential tone requirement for PTT can be temporarily defeated

by grounding TP-14, to TP-1. Function commands can be received without guard tone burst by jumpering TP-6 to TP-8 for test purposes only. If leakage of the 2175Hz PTT holding tone is heard over the air, re-adjust the notch filter for a better null using both R23 & R31. Check the power supply voltages before re-adjusting factory settings. A variation in the 9.1V. and 5V. regulated supplies can cause changes in both detector timing and filter center frequency. Contact the SSC Factory for assistance at (415) 785-4610 if you are in a bind and just can't spare the unit for factory repair.

VII. FIELD ADJUSTMENT OF FACTORY SETTINGS:

(To be performed only after changing parts in the filter circuits).

A properly operating Tone Remote Control and oscilloscope should be used when re-adjusting the factory settings. Consult the attached block diagram and assembly drawings for information concerning the appropriate frequencies, adjustments and corresponding test points.

Place a temporary jumper between TP-6 and TP-8 when tuning the three function tones. Use the Tone Remote Control to generate the applicable tones. Reduce the tone levels by adjusting R6 so that the bandpass filters are peaked with minimum signal applied below limiting. Adjust the notch filter for minimum TX audio output with 1VRMS of 2175Hz applied to the telephone line TX input port.

Perform the procedure in section V above after the units are in the final locations.

VIII. WARRANTY

Standard models of 832 series Tone Remote Adapters are factory warranted for 5 years for parts and 2 years for labor.. Special versions are warranted for 1 year. All work must be done at the SSC Factory. Field replaced parts may be exchanged free on prior factory approval. Unauthorized changes and damage caused by external forces voids the warranty. Consult SSC Catalog for full terms of warranty.

