REMOTE SIGNALING CIRCUIT
MJ MOBILE RADIO TELEPHONE SYSTEMS
EQUIPMENT DESIGN REQUIREMENTS
RADIO SYSTEMS

1. GENERAL

Scope

1.01 This specification, together with the supplementary information listed herein, covers the equipment design requirements to be used in the engineering and installation of the MJ mobile radio telephone system remote signaling circuit. The remote signaling circuit permits operation of the MJ mobile radio base station radio equipment over carrier-type facilities. The equipment consists of four panels, intended for relay rack mounting at the carrier terminals.

Description

General

1.02 The remote signaling circuit converts the dc commands and responses, between the control terminal and the base station radio equipment, to carrier operation. This is accomplished by duplicating the control circuits of the control terminal and radio equipment at opposite ends of the carrier facility. The commands and responses are sent over the carrier facilities as E and M signals and out-of-band tones. Filters are provided on the converters to limit the voice band to 3000 Hz. The carrier facility to be used must have a bandwidth of 3400 Hz or be equipped with C and D program units. To accomplish the E and M signaling, E3B SF units are required. The inputs and outputs of the converters are balanced.

1.03 The transmitter converter (J41646A) is illustrated in Fig. 1 and is designed for use in the transmitting channel of the MJ radio voice path. It is located at the radio site end of the carrier facility and receives the out-of-band fail-safe tone and interprets the E and M signals. These signals are then converted to the direct currents required to operate the transmitter and are combined with the voice signals in the loop to the radio transmitter. The unit consists of relay logic and transistorized circuitry, namely a 3250-Hz (fail-safe tone) detector, a 6-ma current detector (RFON), a repeat coil to combine voice and dc signals, a low-pass filter (3 kHz cutoff), test jacks, and lights.

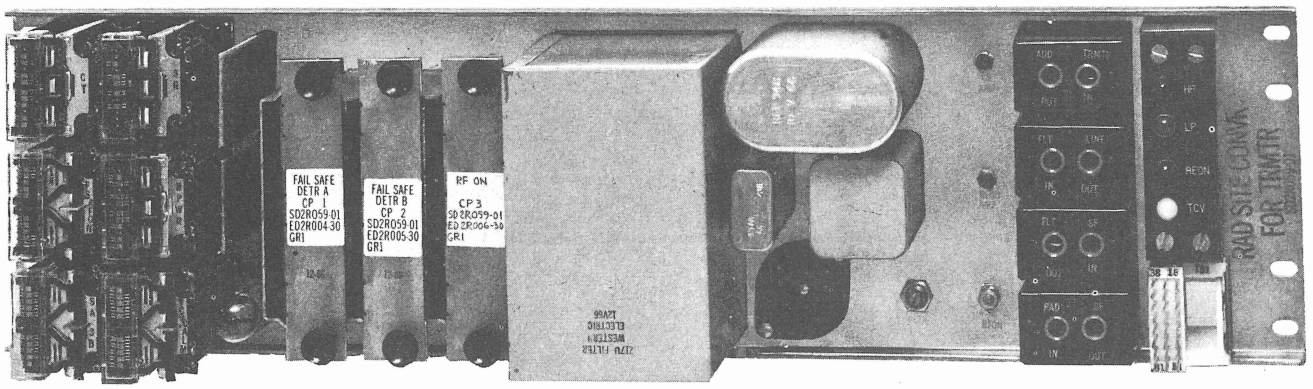

Fig. 1—Radio Site Converter for Transmitter (Pre-Production Model Shown)

1.04 The transmitter converter (J41646B) is shown in Fig. 2. It is designed for use in the transmitting voice path of the MJ radio system. The unit is located at a carrier facility terminal close to the MJ control terminal. The converter recognizes the dc loop commands from the control terminal and sends the appropriate carrier signal consisting of the fail-safe tone and E and M signal. The unit consists of relay logic and a transistorized oscillator (fail-safe tone), a repeat coil to separate the dc signals from the voice, and a low-pass filter (3 kHz cutoff).

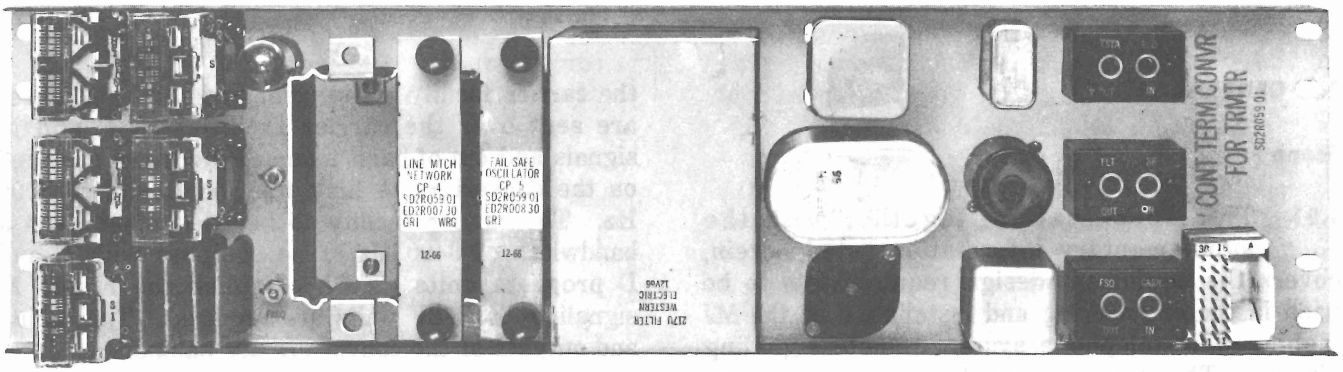

Fig. 2—Control Terminal Converter for Transmitter (Pre-Production Model Shown)

1.05 The control terminal converter for receiver (J41646C) is used in the receiving voice path of the MJ radio system and is illustrated in Fig. 3. This converter is located at a carrier facility terminal near the MJ control terminal. The converter is made up of a repeat coil to insert the receiver quality signal into the voice loop to the control terminal, a low-pass filter (3 kHz cutoff), a bandpass filter (3250 Hz $\pm$75 Hz), and transistor circuitry to convert the carrier quality tone to direct current. The transistorized circuitry is mounted on six printed circuit cards. The quality tone is detected, amplified, and fed to a demodulator, whose output is compared in a phase locked loop. The voltage controlled oscillator in the feedback path of the phase locked loop drives the current generator. The baseband frequency (3550 Hz) is generated by a crystal controlled oscillator.

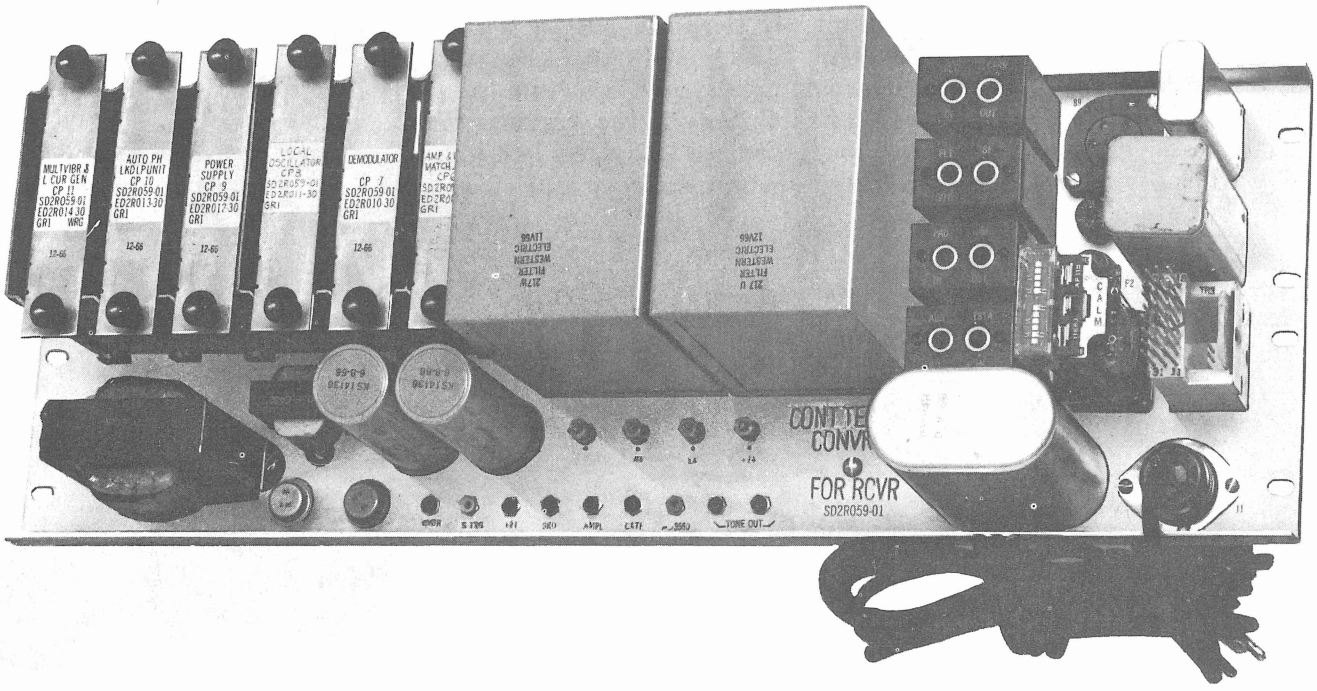

Fig. 3—Control Terminal Converter for Receiver (Pre-Production Model Shown)

1.06 The radio site converter for receiver (J41646D) is shown in Fig. 4. It is designed for use in the receiving voice path of the MJ radio receiver. This unit is located at a carrier facility terminal close to the base station radio. The converter consists of a repeat coil to extract the dc receiver quality signal from the loop, a low-pass filter (3 kHz cutoff), a bandpass filter (3250 Hz $\pm$75 Hz) and three printed circuit cards with transistor circuitry. The detected RQS drives a voltage controlled oscillator (VCO) which feeds a balanced modulator. The carrier frequency is generated by a local oscillator (LO). The output of the modulator is combined with the voice and sent over the carrier facility.

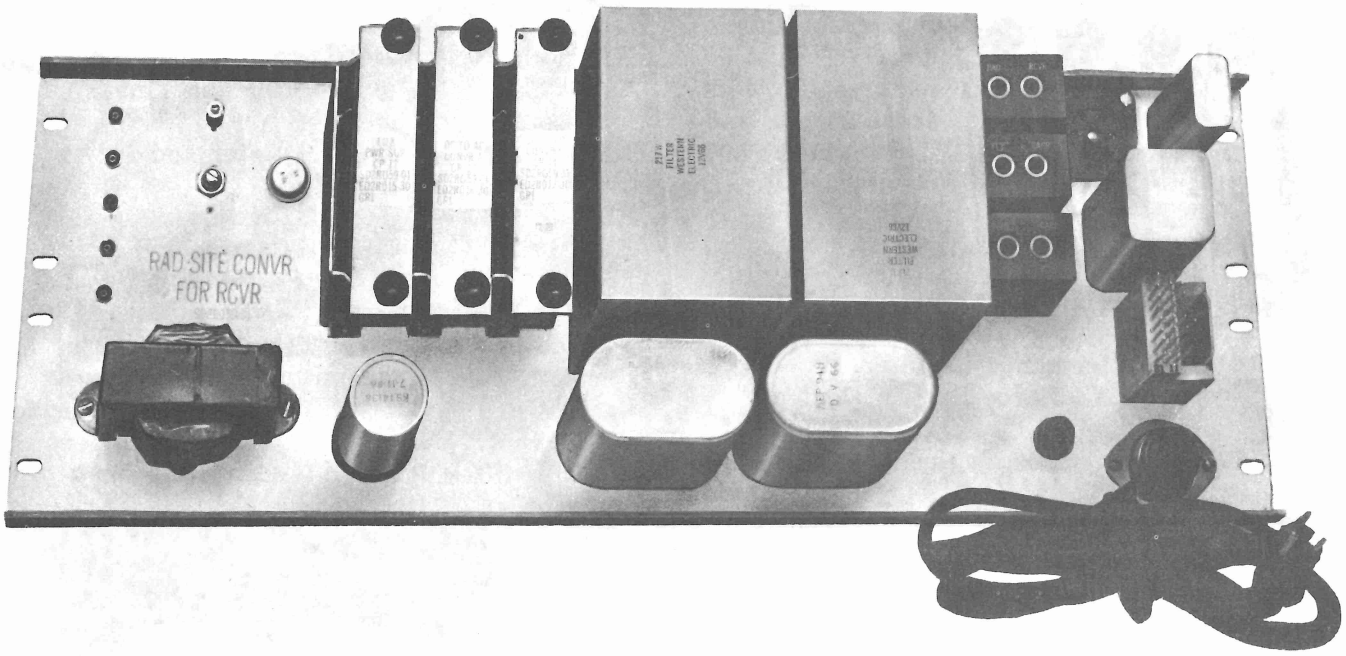

Fig. 4—Radio Site Converter for Receiver (Pre-Production Model Shown)

1.07 Table A lists the sizes and weights of the four panels.

TABLE A

PANEL	HEIGHT	WIDTH	DEPTH	APPROX WEIGHT POUNDS
	INCHES			
Radio Site Transmitter J41646A, L1	6	23	7	19
Control Terminal Transistor J41646B, L1	6	23	7	17
Control Terminal Receiver J41646C, L1	8	23	7	27
Radio Site Receiver J41646D, L1	8	23	7	21

1.08 Power for operation of the four panels must be obtained from an external source. Converter panels A and B require −48 volts dc at 750 ma, converter panel C requires 120 volts ac at 500 ma and −48 volts dc at 20 ma, and converter panel D requires 120 volts ac at 500 ma.

2. SUPPLEMENTARY INFORMATION

800-600-000—List of General Equipment Requirement Sections
806-000-000—Equipment Design and General Equipment Requirements and Engineering Information—Radio Systems and Television Systems
806-157-181—Performance Requirements MJ MRTS Large System Control Terminal
806-157-150—Equipment Engineering Requirements for Large MJ Mobile Radio Telephone
806-158-180—Performance Requirements MJ MRTS Small System Control Terminal
806-158-150—Equipment Engineering Requirements for Small MJ Mobile Radio Telephone
405-000-000—Numerical Index—Division 405
405-200-501—Base Station MJ System Line-Up
405-100-101—MJ Mobile Radio Telephone—Overall System—General Description
Current Drain Data—SD-2R023-02

3. DRAWINGS

WECo J drawings should be ordered by referring to the prefix and base number and requesting the current dash (—) number.

Circuits

SD-2R059-01—Remote Signaling Circuit

Equipment

ED-2R004-30—Fail-Safe Detector A
ED-2R005-30—Fail-Safe Detector B
ED-2R006-30—RF ON Unit
ED-2R007-30—Line Matching Network
ED-2R008-30—Fail-Safe Oscillator
ED-2R009-30—Amplifier and Line Matching Network
ED-2R010-30—Demodulator
ED-wR011-30—Local Oscillator
ED-2R012-30—Power Supply
ED-2R013-30—Automatic Phase Locked Loop
ED-2R014-30—Multivibrator and Line Current Generator
ED-2R015-30—Local Oscillator and Power Supply
ED-2R016-30—DC to AC Converter A
ED-2R017-30—DC to AC Converter B
J41646A-( )—Radio Site Converter for Transmitter Panel
J41646B-( )—Control Terminal Converter for Transmitter Panel
J41646C-( )—Control Terminal Converter for Receiver Panel
J41646D-( )—Radio Site Converter for Receiver Panel

4. EQUIPMENT

J41646A—AT&TCo Std—Radio Site Converter for Transmitter Panel

Equipment—J41646A-( )

Bell Telephone Laboratories

Dept 5111

List 1—Assembly, wiring, and equipment for one radio site converter for transmitter panel per SD-2R059-01, Fig. 1.

J41646B—AT&TCo Std—Control Terminal Converter for Transmitter Panel

Equipment—J41646B-( )

List 1—Assembly, wiring, and equipment for one control terminal converter for transmitter panel per SD-2R059-01, Fig. 2.

J41646C—AT&TCo Std—Control Terminal Converter for Receiver Panel

Equipment—J41646C-( )

List 1—Assembly, wiring, and equipment for one control terminal converter for receiver panel per SD-2R059-01, Fig. 3.

J41646D—AT&TCo Std—Radio Site Converter for Receiving Panel

Equipment—J41646D-( )

List 1—Assembly, wiring, and equipment for one radio site converter for receiver panel per SD-2R059-01, Fig. 4.