COMMON SYSTEMS
TRANSMISSION MEASURING
MILLIWATT DISTRIBUTING CKT
WITH 2A SENDING PANEL

CHANGES

B. CHANGES IN APPARATUS

B.1 Added

In Fig. F

(MM) OPTION

2 - Res. (T16) and (R16) KS-16311, L1-2110 ohms

In Fig. J

(NN) OPTION

2 - Res. (T17) and (R17) KS-16311, L1-2110 ohms

B.2

Superseded	Superseded By
In Fig. 6	
1 - Res.(A) 111B 1200Ω	1 - Res.(A) 227A 1200Ω
2 - Res.(B&C) 111B 600Ω	2 - Res.(B&C) 227A 600Ω
1 - Res.(D) 111B 240Ω	1 - Res.(D) 227A 240Ω
2 - Res.(E&F) 111B 120Ω	2 - Res.(E&F) 227A 120Ω
1 - Res.(G) 111B 48Ω	1 - Res.(G) 227A 48Ω
1 - Res.(H) 111B 24Ω	1 - Res.(H) 227A 24Ω
2 - Res.(J&K) 111B 12Ω	2 - Res.(J&K) 227A 12Ω
2 - Res.(L&N) 111A 2.05Ω	2 - Res.(L&N) 227C 2.05Ω
1 - Res.(P) 111A 1.33Ω	1 - Res.(P) 227C 1.33Ω
1 - Res.(M) 111A 4.02Ω	1 - Res.(M) 227C 4.02Ω

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Options (MM) in Fig. F and (NN) in Fig. J were added as covered in B.1 above to provide adjustable output for calibration of measuring equipment.

D.2 In Fig. 6 the 111 type resistors were lined out as they are discontinued for the figure and replaced by 227 type resistors. For correct code see B.2 above.

D.3 Figures 2K, 6K and EK are revised to show optional straps and resistors.

D.4 Notes 136, 137, 138, 139, 140 Table A and Fig. 102 are added.

D.5 Figures 2, 6, A, E, 2K and 6K, 2L, 2M, AK, AL, EK, EL, EM are rated MFR DISC.

D.6 Notes 102, 104, and 106 are rated MFR DISC.

D.7 The rating of the drawing was changed to "A & M only," from "AT&T Co. standard" to permit additions of Fig. F & J to existing installations. Replaced by SD-95000-02 was also added to the drawing.

All other headings, No change.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 2137-PFJ-BCB-DB

COMMON SYSTEMS
TRANSMISSION MEASURING
MILLIWATT DISTRIBUTING CKT
WITH 2A SENDING PANEL

CHANGES

B. CHANGES IN APPARATUS

B.1 Added (optional)

In Fig. 6

1 - Res. (N) 111A, 2.05 ohms
1 - Res. (P) 111A, 1.33 ohms

B.2 Added

In Fig. F

1 - Network (Z1) KS-16744, L1
1 - Res. (T14) KS-16311, L1, 4220 ohms
1 - Res. (R14) KS-16311, L1, 4220 ohms
1 - Rep. Coil (B) 120E
1 - Res. (TR1) KS-16311-L2, 898 ohms

D. DESCRIPTION OF CIRCUIT CHANGES

D.01 Figs. J, JK, JM, FK and FM and Notes 130, 131, 132, 133, 134, 135, 202, 203, 308, 309 and 310 were added.

D.02 Figs. B, D, G and H and Notes 121, 123, 124, 125, 130, 131, 132, 302, 303, 304, 305, 306, 307 were rated "MFR DISC."

D.03 Fig. 6 was revised to include "GG" option.

D.04 Note 303 was revised to include resistors (N) and (P).

D.05 Circuit Note 126 was revised to include options "JJ" and "KK", Fig. J and Notation**.

D.06 Fig. 2 was revised to include connection of ST lead to Fig. J.

D.07 Fig. F was revised to include "HH", "JJ" and "KK" options and to rate "HH" option "MFR DISC." "LL" option was also added.

D.08 Fig. 101 was revised to include reference to Figs. F and J and to omit Fig. B.

D.09 Figs. 2K and 6K were revised to connect to Figs. FK, FM, JK and JM.

D.10 References to Equipment Information per J94002AC and J94002AD were added.

D.11 Connecting circuits 4.7 to 4.11 were added.

4. CONNECTING CIRCUITS

4.7 Trans. Test Line Ckt - SD-98100-01
4.8 Test Termination Ckt - SD-96476-01
4.9 Noise Measuring Ckt - SD-59433-01
4.10 Noise Measuring Ckt - SD-95136-01
4.11 Trans. Measuring Ckt - SD-95900-01

All other headings, no change.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 2137-PFJ-BCB-ME

COMMON SYSTEMS
TRANSMISSION MEASURING
MILLIWATT DISTRIBUTING CKT.
WITH 2A SENDING PANEL

CHANGES

B. CHANGES IN APPARATUS

Superseded	Superseded by
In Figs. A, B and E	
2-Res. (T5 & R5) 106A	2-Res. (T5 & R5) 145A
In Fig. D	
2-Res. (T6 & R6) 106A	2-Res. (T6 & R6) 145A
In Fig. F	
2-Res (T11 & R11) 106A or 107A	2-Res. (T11 & R11) 145A
In Fig. G	
2-Res. (T12 & R12) 106A or 107A	2-Res. (T12 & R12) 145A
In Fig. H	
2-Res. (T13 & R13) 106A or 107A	2-Res. (T13 & R13) 145A

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 "EE" and "FF" options were added in figures A, B, D, E, F, G and H to cover B.1 above. "EE" option only was previously shown and not rated "Mfr. Disc."

D.2 Circuit note 121 was revised to show standard values for resistors (T5), (R5), (T6) and (R6).

D.3 Circuit note 124 was revised to show "EE" and "FF" options.

D.4 Circuit note 129 was added.

D.5 Note 307 was added.

D.6 In Figures A and E connection to "Sending Jack Circuit", was added.

D.7 Figure 101 was revised to include reference to, "See notes for compensation for office wiring loss."

All other headings, No change.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 2133-PFJ-SD-CU

COMMON SYSTEMS
TRANSMISSION MEASURING
MILLIWATT DISTRIBUTING CKT.
WITH 2A SENDING PANEL

CHANGES

B. CHANGES IN APPARATUS

B.1 Superseded	Superseded By
1 - Cond. (A) 175BW 0.385 mf ±1%	1 - Cond. (a) 475BW 0.385 mf ±1%

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 Note 128 was added.

All other headings, No change.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT. 2133-TJM-SD-AY

COMMON SYSTEMS
TRANSMISSION MEASURING
MILLIWATT DISTRIBUTING CIRCUIT
WITH 2A SENDING PANEL

CHANGES

B. CHANGES IN APPARATUS

B.1 Added (optional)

In Figs. F, G and H

1 - Rep. Coil (B) 120GS

B.2 Superseded — Superseded By

In Fig. B

1 - Rel (ST2) E437 — 1 - Rel (ST2) E6166

In Fig. C

1 - Rel (ST3) E437 — 1 - Rel (ST3) E6166

In Fig. D

1 - Rel (ST4) E437 — 1 - Rel (ST4) E6166

D. DESCRIPTION OF CIRCUIT CHANGES

D.1 In Figs. F, G and H, "AA" and "BB" options are added to cover B.1 above. "AA" option only was previously shown.

D.2 In Figs. B, C and D, "CC" and "DD" options are added to cover B.2 above. "CC" option only was previously shown and has been rated "Mfr. Disc."

D.3 Figure 101 was added.

D.4 Notes 125, 126, 127 and 306 were added.

D.5 Notes 119, 121, 124, 201 and 302 were revised for clarification.

D.6 Figs. 2K and 6K were revised for clarification.

All other headings, under changes, no change.

1. PURPOSE OF CIRCUIT

1.1 This circuit is used to supply 1000 cycle testing power to a number of test outlets, as required. Each outlet provides a known output, of not more than 1 milliwatt, for use with transmission measuring systems.

2. WORKING LIMITS

2.1 The output at each outlet should be as specified ±0.1 db and substantially independent of AC supply, temperature and load or momentary changes of load.

2.2 The nominal output value is one milliwatt in a 600 ohm terminating resistance. Other output values which are less than 1 MW can be provided.

3. FUNCTIONS

3.1 This circuit provides reference power for calibrating portable test equipment, including transmission measuring sets, amplifier-rectifiers detectors and meters of which the db scale values are based on one milliwatt.

3.2 Adjustment of the output to the reference power is made initially by means of soldered connections and changed when necessary on subsequent occasions when suitably accurate means of checking this power of one milliwatt in 600 ohms is available.

3.3 This circuit provides a means of automatically turning off the 115 volt ac supply when the testing power is not required.

3.4 The 1000 cycle motor generator supplies reference testing power to a number of outlets simultaneously. This provides for applications for testing voice channels of transmission systems, intertoll trunks, and other trunks, lines, circuits or networks.

4. CONNECTING CIRCUITS

4.1 Test Line Circuits for one-way transmission testing - SD-96000-01

4.2 Miscellaneous Jack Circuits

4.3 Sending Jack Circuits - SD-95101-01

4.4 Sending Pad Circuits - SD-95147-01 and SD-95017-01

4.5 Transmission Measuring Circuits - SD-59432-01 and SD-95135-01.

4.6 Repeater Measuring Circuit - SD-59462-01.

DESCRIPTION OF OPERATION

5. GENERAL

5.1 This circuit consists of a motor generator which operates from 115V ac supply, and generates a sine wave voltage at a frequency of 1000 cycles per second. This voltage is applied through a repeating coil to several shunt load resistors, which are adjustable by means of soldered straps. In the early product these were adjusted by means of a sliding contactor. One or more of the shunt load resistors consists of two series resistors of 296 ohms and a 600 ohm terminating resistor which represents a line to be tested. Each one milliwatt outlet is of this general form which is represented by Fig. B.

Operation

5.2 The adjustment of the total output so that the required voltage is supplied to each outlet is obtained by connecting a 7A transmission measuring set in place of a 600 ohm terminating resistor, and changing the shunt load strapping until one milliwatt is indicated on the 7A Set. In changing the adjustment, it will be found convenient to determine the effect of 10 outlets by adding or removing the resistor marked 10 (See Fig. 6) and noting the change in db on the meter of the measuring set. This change divided by 10 is the change per outlet. With this number and the amount of deviation from one milliwatt it will be evident how many outlets to add or remove to bring the adjustment to the desired reading. This may require a second try if the first number was large.

5.3 The compensating coil and associated 2 and 4 ohm resistances are provided for the purpose of reducing to a negligible amount the variation of the output with the temperature. The strapping depends somewhat on the circuit with respect to the filter, but normally is about as follows:

No filter	Compensating coil with 2 and 4 ohms shorted
With retard (A) and condenser (A)	Compensating coil with 2 ohms shorted

If output is higher when hot than when cold add 2 resistors in series; if lower decrease the series resistance. The condition referred to as hot is intended to mean that reached after about one hour of continuous operation. By cold is meant the temperature after at least an hour with the power supply turned off. Repeat 5.2 for final adjustment of output.

5.4 The motor generator will be started through the operation of the KS 5483 relay. This is accomplished by connecting the ST1 lead to ground at any one of the outlets or terminations.

5.5 The (A) retardation coil and (A) capacitor (Fig. 2) suppresses the 3rd harmonic and to some extent the 2nd harmonic of the 1000 cycle output.

6. CONNECTING INFORMATION

6.1 The choice of the optional outlet arrangements depends upon the connecting circuits. Distributing resistors are shown on this drawing for all applications. These are normally provided in the same bay with the motor generator. The series resistors reduce to a negligible amount the disturbance by test operations to the voltage at the common point for all outlets, and also reduces the interaction effects between any two outlets.

6.2 Output or sending impedances which are provided by this circuit, and the associated optional figures are as follows:

	Figures				
Load Outlets	135	600	900	1200	1500
Normally terminated at jacks or switch		A,E	F	G	H
Normally open at jacks or switch	D	B			

6.3 Connecting circuits should be arranged to terminate the milliwatt distributing circuit either by the circuit under test or by a resistor at all times except the possible momentary interval of the relay operation such as the (S2) relay in Fig. B or the plugging in at a jack.

6.4 When no circuits are being tested the power to the motor is disconnected by the power relay shown in Fig. 2. In some tests the ST lead of Fig.

2 is connected to ground by contacts on a relay such as (S2) in Fig. B which in turn is operated by a jack contact. Relay (S2) operated, operates the power relay which connects power to the motor.

BELL TELEPHONE LABORATORIES, INC.

DEPT. 2133-PFJ-HBF