

# of TELEPHONE EQUIPMENT & SUPPLIES CATALOG

ISSUED SEPTEMBER, 1965

## CENTRAL OFFICE TEST EQUIPMENT

### Relay and Switch Adjusting Test Sets

	Page
C Relay Test Sets.....	2
Dialing and Talking Test Sets.....	2
Linefinder Switch Test Stands.....	2
Type 3A Resistance Test Boxes.....	3
Reverse Battery Test Circuits.....	3
Rotary Test Sets for Absence of Ground Searching Switches.....	3
Rotary Test Sets for Battery Searching Selectors.....	4
Type TE 89 Varying Machines.....	4
Type 26A Switch Testers.....	4
Type 28 Semi-Automatic Routiners.....	5
Model S Current Flow Test Sets.....	5
Applique Meter Circuits for Current Flow Test Sets.....	5

### Toll and Intertoll Trunk Test Equipment

Code 101 Test Terminations.....	6
Milliwatt Test Line Circuits.....	7
Code 100, 102 and 103 Test Terminations.....	7
81 DB Attenuators.....	7
MF Pulsing Trunk Test Sets.....	8
Negative Impedance Repeater Test and Installers' Sets.....	8
Type 27A Signaling Test Sets.....	9
Toll Pulse Repeating Test Sets.....	9
Re-Ring Relay Test Sets.....	10
Type 25 Signaling Test Sets.....	10
Type 24 Single Frequency Test Sets.....	10
Non-Synchronous Reverse Battery Test Line Equipment.....	11
End Office Communication and Test Trunk Circuits.....	11
Test Tone Generator 1000-Cycle, 1 Milliwatt Circuits and Distribution Circuits.....	12
End Office Transmission Test Circuits.....	12
Transmission Test Connector Circuits.....	13
Type 800 Hand Test Telephone.....	13

### Local Trunk Test Equipment

Test Line Circuits for Local Offices.....	13
Local Pulse Repeating Test Sets.....	14
Pulse Speed and Percent Break Test Sets.....	14
Type 180L Local Test Panels.....	15
Type 21A Wire Chiefs Test Units.....	16
Type 22 Wire Chiefs Test Units.....	17
Type 23 Wire Chiefs Test Units.....	17

### Toll Board Test Equipment

Impulse Sender Test Sets.....	18
Routine Test Sets for Impulse Senders and Digit Relays.....	18
Portable Test Sets for Type 31 Toll Board Trunks.....	18
Type 180 Toll Test Panels.....	19

### Automatic Line and Local Equipment Routiners

Automatic Equipment Routiners.....	20
Type 2A Automatic Line Insulation Routiners.....	20
Printrollers.....	21
Automatic Trunk Routiners with Transmission Loss Measuring.....	22

### SATT Test Equipment

	Page
Type 59 Ticketer Test Sets.....	23
Type 62 Ticketer Test Sets.....	23
Type 62 Position Test Sets.....	23
SATT CKO Operators' Position Test Sets.....	24
Type 59 SATT Monitor Panels.....	24
Type 62 SATT Monitor Panels.....	24
Party Identity Testing Circuits for 4-Party Type 62 SATT without Spotter Battery.....	24
Dial Speed and Party Identity Test Circuits.....	25
SATT System Type B Terminal Detection Test Sets.....	25

### Traffic Study Equipment

Trafficorders.....	26
Answering Time Recorders with Weighting Facility.....	26
Type 80143 Alston Electronic Traffic Scanners—Portable.....	27
Type 80151 Alston Electronic Traffic Scanners—Permanently Mounted.....	27
Alston Portable Service Observing Equipment—Tape Type.....	28
Service Observation Equipment.....	29
Dial Tone Delay Recorders.....	29

### Miscellaneous Test Equipment

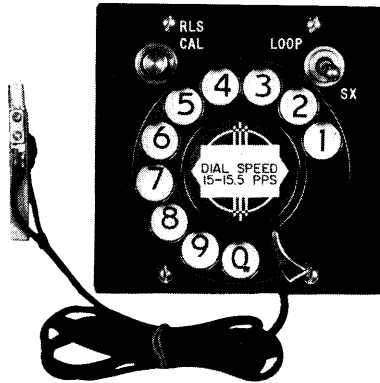
Type 800 Hand Test Telephone.....	13
McAllister Automatic Dialing Routiners and Grade of Service Recorders.....	30
Routiner Multiple Calling Line Selectors.....	30
Type P-672-B Proctor Pulse Generators.....	31
Type P-71 Proctor Universal Test Adapters.....	31
Type P-70 Proctor Switch Routining Adapters.....	31
Type P-652 Proctor Pulse Distortion Analyzers.....	31
Type P-1035 Proctor Remote Pulse Indicators.....	32
Type F4 Frahm Portable Frequency Meters.....	32
Type MF-15 Frahm Miniature Portable Frequency Meters.....	32
Type TTS-49AE Northeast Electronics 6-Frequency, 1-Milliwatt Tone Generators.....	33
Type TTS-39BAE Northeast Electronics 1 Kilocycle, 1-Milliwatt Tone Generators.....	33
Shallcross Test Sets.....	34
Busy Clips.....	34
Cord and Test Clips.....	34
Lineswitch Test Pencils.....	34
Bank Busing Tools.....	34
Harmonic Ringer Boxes.....	34
Test Lamps.....	35
Buzzer and Talking Test Sets.....	35
Retractable Cord and Plug (or Clip) Assemblies.....	35
Test Plugs.....	35
Test Plugs and Cords.....	35
Test Cords.....	36
Ground Cord Assemblies.....	36
Test Plug and Cord Assemblies.....	36
Switch Supports.....	37
Switch Test Stands.....	37

## AUTOMATIC ELECTRIC COMPANY

NORTHLAKE, ILLINOIS 60164 / TELEPHONE (312) 562-7100

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## C Relay Test Sets



The C Relay Test Set is a portable unit designed to check the release time of the C relay (or other relays performing similar functions) of Strowger two motion switches. This test set permits testing of the C relay in a loop or simplex pulsing switch. The C Relay Test Set is a special dial arranged to send two groups of pulses separated by a checking period of constant and predetermined length. The "C" relay should release within this timed period.

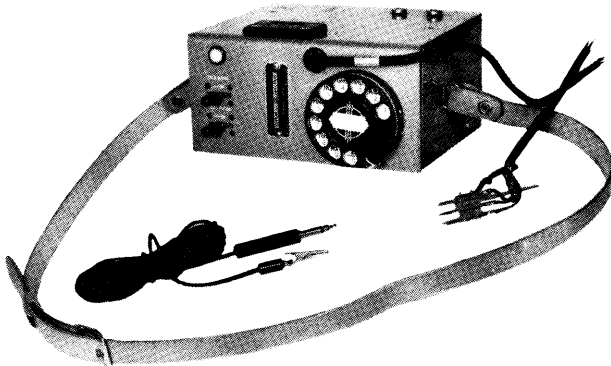
The following features are provided: Arranged for loop and simplex pulsing. The dial is adjusted to a speed of 15.0 to 15.5 pulses per second and about 61.5% break. When the digit "0" is dialed, five pulses (open loop or open simplex) are transmitted, followed by a closed circuit checking interval of 155 milliseconds duration, which in turn is followed by three more pulses (open loop or open simplex). Spark suppression is provided for the pulsing contacts.

Width, 4 inches; height, 4 inches; depth,  $3\frac{3}{16}$  inches.

Order No.	Description	Price Each
<b>H-880623-3</b>	C Relay Test Set.....	<b>\$25.00</b>

REFERENCE: Technical Bulletin 108-696.

### Dialing and Talking Test Sets For Simplex Dialing Intertoll Selectors



This test set is a portable unit which permits testing of simplex dialing intertoll selectors and trunks.

Tests which can be performed by using the unit include monitoring, dialing, talking, and supervision. The set can be used with an external pulsing source for pulsing tests.

Transmission battery is supplied by the switch trunk under test.

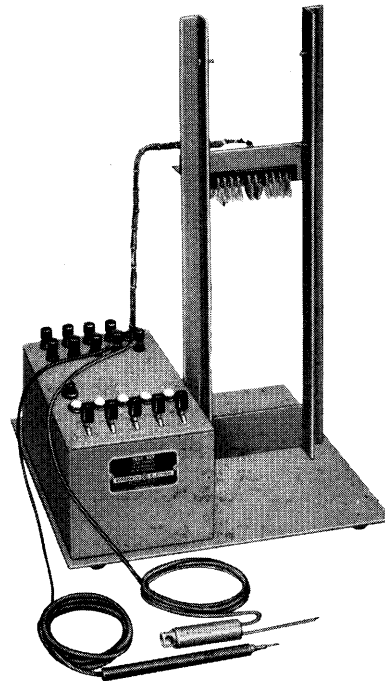
Overall dimensions:  $8\frac{3}{16} \times 7\frac{3}{32} \times 4\frac{1}{4}$  inches.

Order No.	Description	Price Each
<b>H-880859-1</b>	Dialing and Talking Test Set.....	<b>\$130.00</b>

R-2

Prices are subject to change without notice.

## Linefinder Switch Test Stands



The Linefinder Switch Test Stand is designed to perform tests on linefinders which have been removed from the shelf for repair. It is not intended for a routine inspection of linefinders. All commonly used Automatic Electric Company, Strowger 2 motion linefinders can have their basic operations tested.

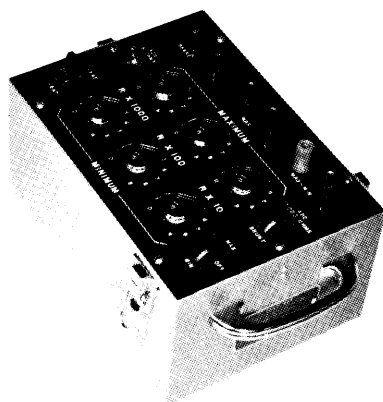
The Linefinder Switch Test Stand provides means for performing the following tests on linefinders: Vertical and rotary stepping. Continuity of all leads to the linefinder switch jack. Continuity of a closed circuit through all the relay break contacts with the relay normal, and for an open circuit with the relay operated. Continuity of a closed circuit through all the relay make contacts with the relay operated, and for an open circuit with the relay normal using the test prod with the lamp assembly. Continuity of all wiper circuits.

The Linefinder Switch Test Stand is mounted on a metal platform measuring  $13\frac{23}{32}$  inches wide and  $10\frac{1}{32}$  inches deep. On the left side of the platform is a metal box which contains the test equipment. On the right side of the platform a linefinder shelf jack is securely mounted in a mounting bracket.

Order No.	Description	Price Each
<b>H-881444-1</b>	Used when linefinders have magnet interrupter springs with break contacts, and cam springs place battery on test 1 lead.....	<b>\$125.00</b>
<b>H-881444-2</b>	Used when linefinders have magnet interrupter springs with make contacts, and cam springs ground the guard (G) lead.....	<b>125.00</b>

REFERENCE: Technical Bulletin 108-716.

### Type 3A Resistance Test Boxes



The Type 3A Resistance Test Box is a portable unit designed to place a known resistance value into a test circuit. The primary purpose of the resistance test box is to regulate the amount of current flowing through the relay windings or other electrical apparatus to which it can be connected.

This resistance box determines whether a relay is operating correctly. The standards for individual relay operation are specified on relay adjustment sheets which the manufacturer issues for each circuit incorporating relays. A current of a given value, flowing through the windings of electromagnetic coils, causes the armatures of the associated relays or other devices to operate, or not to operate within margins, depending on the design of the circuit or switching device. It utilizes slow-blow fuses and features a reverse-battery key that reverses polarity for checking polarized relays; and a shunt key to get full battery current for maximum armature pull-down.

The Type 3A Resistance Test Box is furnished with one 2-conductor battery supply cord (D-543175-C).

It is housed in a gray metal cabinet with metal carrying handle and detachable cover. With cover, the cabinet is approximately  $7\frac{3}{16} \times 10\frac{5}{16} \times 6\frac{11}{16}$  inches.

Order No.	Description	Price Each
<b>H-884771-1</b>	Type 3A Resistance Test Box . . . . .	<b>\$220.00</b>

### Reverse Battery Test Circuits

The Reverse Battery Test Circuit is arranged to provide distinctive tone and reversal flashes to identify correct terminal. It is also used for the application of marginal tests to connectors.

Starts to function after 500 ms.

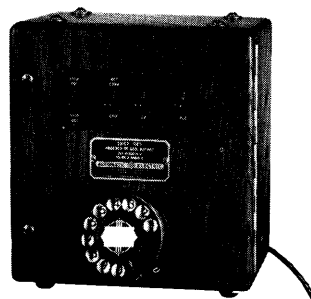
The operational equipment of the Reverse Battery Test Circuit is mounted on a steel base and wired to a multi-contact jack.

Order No.	Description	Price Each
<b>DH-61939-A40A</b>	Reverse Battery Test Circuit (1 Ckt) . . . . .	..*
<b>DH-61939-A41A</b>	Reverse Battery Test Circuit (2 Ckts) . . . . .	..*

\*Prices will be furnished on request.

### Rotary Test Sets

#### For Absence of Ground Searching Switches



The Rotary Test Set is a portable unit designed to test for proper rotary action of absence of ground searching selectors and trunk hunting connectors. The test set permits testing of switches with 10 or 20-trunks per level. The test set is equipped with a 10 and 20-point bank busy tool or with a 10-point bank busy tool only.

In addition to the points mentioned above, the test set includes the following features: Provides a no stop test in which the switch under test rotates its wipers over the contacts on the test level. Provides a stop test in which the switch under test rotates its wipers to a predetermined contact on the test level. Provides loop or simplex pulses.

The test set consists of a cabinet 9 inches wide,  $9\frac{1}{2}$  inches high and 5 inches deep. The cabinet is made of plain oak and finished in dark oak, presenting an attractive appearance. The front panel is hinged, providing ready access to the interior of the cabinet.

Order No.	Description	Price Each
<b>H-64618-1</b>	Equipped with 2-bank busy tool. One for 20 trunks per level and one for 10 trunks per level . . . . .	<b>\$270.00</b>
<b>H-64618-3</b>	Equipped with 1-bank busy tool for 10 trunks per level . . . . .	<b>270.00</b>

## Rotary Test Sets

## For Battery Searching Selectors

The Rotary Test Set is a portable unit designed to provide an operate and non-operate test for relay-interrupted battery-searching 10 and 20-trunk level selectors with or without split C lead. This test set is not arranged to test selectors employing 3-pole relays.

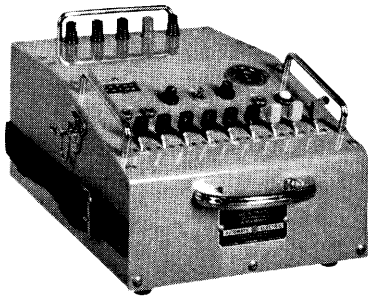
In addition to the points mentioned above, the test set includes the following features: Provides a check on both electrical and mechanical characteristics of the selector. Routing test limits may be applied to the equipment as re-

quired. Insures good stopping of selectors and no double-stopping because of wiper overthrow (improper mechanical adjustment) under normal operating conditions. Provides loop or simplex pulses.

The test set's functional equipment is housed in a gray baked enamel metal case measuring 8 inches wide, 8 inches high and 8 inches deep. The case is provided with a carrying handle. A hinged, sloping front panel, provides access to the interior of the case.

Order No.	Description	Price Each
<b>H-881174-1</b>	Rotary Test Set for Battery Searching Selectors.....	<b>\$251.00</b>

## Type TE 89 Varying Machines



The Type TE 89 Varying Machine is a portable test set designed to test the ability of Strowger type switches to follow dial pulses under various operating conditions. Extreme line conditions can be simulated for testing connector and selector switches. Because the test set is portable the switches can be tested in their permanently mounted location.

The following tests can be performed using the Type TE 89 Varying Machine: loop test, leak test, magnet test, and C relay release test. The varying machine can also be used in conjunction with the Local Pulse Repeating test set, Toll Pulse Repeating test set or the Type 26A Switch Tester, to provide a continuous source of pulses and to simulate various line conditions.

The Type TE 89 Varying Machine is supplied with the necessary cords for interconnecting the test set and the equipment to be tested. These consist of a battery cord, switch test cord, and a magnet test cord.

A remote control test set containing six push buttons, also located on the test set control panel, is provided to permit the tester to perform tests at a maximum of 16 feet from the test set.

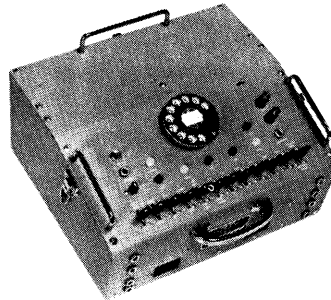
The equipment comprising the Varying Machine is mounted in a gray pebble finish enameled aluminum case. The case measures  $14\frac{3}{16}$  inches wide,  $8\frac{1}{2}$  inches high and  $13\frac{15}{16}$  inches deep. The case is equipped with a carrying handle and a removable latch type cover.

Approximate weight, 19 pounds.

Order No.	Description	Price Each
<b>H-882240-1</b>	Type TE 89 Varying Machine.....	<b>\$575.00</b>

REFERENCE: Technical Bulletin 108-517.

## Type 26A Switch Testers



The Type 26A Switch Tester is a portable, self-contained unit which permits the performance of functional testing, at the switch shelf, of a wide variety of step-by-step telephone equipment. The tester may be used alone or may be used in conjunction with a Varying Machine.

The tester is capable of testing the following switches: local; toll and combination connectors; toll transmission selectors, with or without C lead; paystation repeaters; coin control switches with adapter; reverting call switches; directory number reverting call switches; and directory number reverting call connectors.

In addition to the points mentioned above the tester has the following features: Remote Control Set for testing from locations away from the test set. Arranged to release or release by operator's option, the switch under test after completion of testing. Provides either a leak resistance or loop resistance balanced on each side of the loop. Jacks for operator's headset or handset for monitoring 2-wire toll transmission circuits to determine if busy before seizure or to check various tones that may be returned by the switch under test. Indicates when connected to a busy switch before seizing it. Checks local, toll, and combination connectors for busy, idle, ring, false trip, answer, transmission and release. Checks coin deposit features of toll transmission selectors. Simulates coin deposit conditions when testing paystation repeaters and checks return of coin control battery from repeater. Arranged to detect either bridged or divided ringing. Has provision for imposing direct ground when testing trunk hunting connectors. Provides a timed open period on lead EC for an automatic ring start signal when testing toll connectors.

The test set is housed in a gray metal case. The case has a metal carrying handle and detachable cover. The overall measurement of the test set including the cover is  $14\frac{3}{16}$  inches wide,  $8\frac{1}{2}$  inches high and  $13\frac{15}{16}$  inches deep.

Approximate weight, 40 pounds.

Order No.	Description	Price Each
<b>H-885068-1</b>	Type 26A Switch Tester.....	<b>\$700.00</b>

REFERENCE: Technical Bulletin 108-706.

## Type 28 Semi-Automatic Routiners

The Type 28 Semi-Automatic Routiner is a portable test unit designed to test individual selector switches, connector switches, or inter-office trunk repeaters. The Routiner combines the testing facilities of a semi-automatic test set with a pulsing test set in one portable unit, designed to operate on an exchange voltage of 48.5-50-volts, d-c.

All two-digit connectors, frequency-selecting connectors that use the frequency digit first or last, and 200-line connectors may be tested with the Routiner. Some of the tests which may be performed with the Type 28 Semi-Automatic Routiner are: selector cut-in and release; selector rotary speed; selector bank continuity; connector ring and talk, or busy; loop, leak, and standard pulsing; line polarity.

Tests to be performed by the Routiner are determined by the test cord used (A or B, furnished with the Routiner) and the controls, indicators, and jacks on the control panel. The keys and switches on the control panel are used to set up the required conditions under which the various tests are to be performed. A supervisory lamp provides illumination for both switch inspection and test supervision.

Test cord "A" is used for tests using the automatic functions of the Routiner, such as selector cut-in and release, selector bank continuity, connector ring and talk or busy, and trunk circuit repeaters. Test cord "B" is used for pulsing tests under various loop and leak conditions. Both test cords extend pulses at a constant speed of 12 pps.

In addition to the points mentioned above, the Routiner provides many test features, some of which are: Automatic release of switch after each test. A definite time interval between successive digits dialed for any test number. Provides a monitoring feature for an audible check of test tones and transmission. When dialing through wink repeaters, the Routiner stops dialing when reversed polarity is encountered; however, it will resume dialing when polarity is restored to normal. Pulse ratio of 68.5 percent break or 31.5 percent make for all loop tests and LP pulsing conditions. Pulse ratio of 60.5 percent break or 39.5 percent make for all leak tests and LK pulsing conditions. Selection of a loop seizure resistance from 2,000- to 3,100-ohms. Selection of LP, LK, or STD pulsing conditions. Pulse ratio of 61.5 percent break or 38.5 percent make for STD pulsing condition.

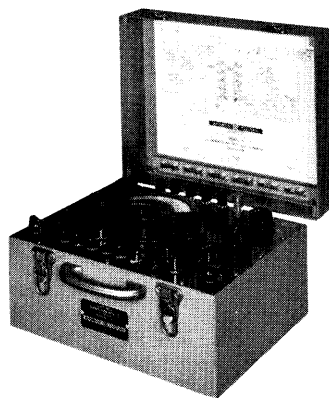
The Type 28 Semi-Automatic Routiner is housed in an aluminum case having a gray pebble baked enamel finish. Two carrying handles are conveniently located, one on each end, to facilitate handling.

Approximate dimensions: width,  $20\frac{1}{16}$  inches; depth,  $11\frac{1}{16}$  inches; height,  $10\frac{5}{8}$  inches.

Order No.	Description	Price Each
<b>H-885113-1</b>	Type 28 Semi-Automatic Routiner.	<b>\$1050.00</b>

REFERENCE: Technical Bulletin 108-454.

## Model S Current Flow Test Sets



The Current Flow Test Set is a portable unit used to test the operations of relays in central office equipment. The current flow to a particular relay under test can be controlled at a set value to ascertain that the relay is functioning within its specified limits. The test set is so equipped that the relays can be tested without removal from their mounting.

The test set has three controlled meter ranges, .030, .150, and .750 amperes. Each meter range is fused individually. Relays can be tested at their operate and non-operate values by presetting the operate and non-operate potentiometers to the proper resistance value. A key is provided which places either the operate or non-operate potentiometers in the circuit, depending on the position the key is operated to. This facilitates performing both tests without changing the hookup.

The polarity of the current flow to the relay under test can be reversed by operation of a key. Operation of this key also reverses the polarity of the current flow in the test set circuit.

If an auxiliary resistance is required, that is a resistance that cannot be provided by the operate or non-operate range potentiometers, it can be connected across the auxiliary resistance terminals.

Hold and release tests on special relays can be performed. A key is provided to allow for saturation of a relay coil.

The test set meter can also be used to measure the current flowing in an external circuit.

The Current Flow Test Set is mounted in a gray metal case. The case has a metal carrying handle and a detachable cover. Spare fuses and a circuit label are mounted on the underside of the cover.

Dimensions: Width,  $12\frac{1}{2}$  inches; height,  $7\frac{9}{16}$  inches; depth,  $11\frac{15}{16}$  inches.

Order No.	Description	Price Each
<b>H-882790-1</b>	Model S Current Flow Test Set.....	<b>\$295.00</b>

REFERENCE: Technical Bulletin 108-712.

## Applique Meter Circuits For Current Flow Test Sets

The Applique Meter Circuit for Current Flow Test Set is a portable unit used in conjunction with the current flow test set (Model S or earlier models) for low current relay measurements. As with the current flow test set alone, it is possible to test relays without removal from their mountings.

The applique meter circuit has a controlled meter range of .005 ampere. This circuit has its own fuse. Testing operations are done for the most part on the main current flow test set.

The operation of a key provides additional series resistance if required.

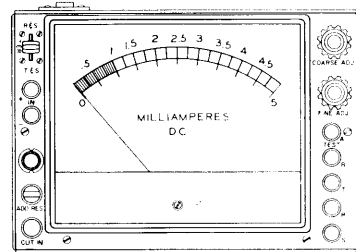
All necessary patch cords are provided.

Mounted in a gray metal case with metal carrying handle and a detachable cover.

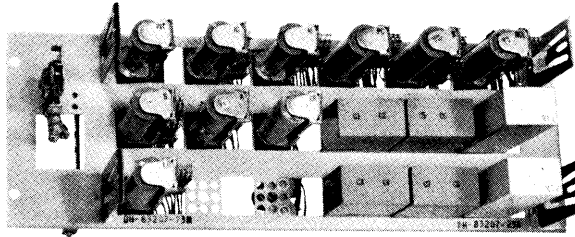
Dimensions: width,  $10\frac{5}{32}$  inches; height,  $6\frac{5}{8}$  inches; depth,  $7\frac{5}{32}$  inches.

Order No.	Description	Price Each
<b>H-884051-1</b>	Applique Meter Circuit for Current Flow Test Set .....	<b>\$155.00</b>

REFERENCE: Technical Bulletin 108-712.



Prices are subject to change without notice.

**Code 101 Test Terminations**

The Code 101 Test Termination is rack mounted equipment used for testing of intertoll trunks. It provides a communication and test line into a toll testboard or test position which can be reached by any dial trunk in the switching system served by that test position. It is used for reporting trouble, making transmission tests, etc.

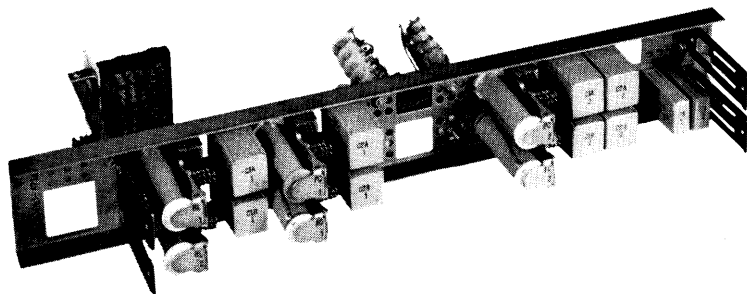
The following features are provided on the Code 101 Test Termination circuit: Fourth wire (EC lead) supervision. Supervision either when call is answered or on trunk seizure. Idle line termination. Ringback tone. Delayed flashing line lamp. Optional flashing recall. Fixed pad via-net-loss operation for intertoll tandem service. Arranged for re-ring under control of battery and ground connected from cord circuit, opening sleeve, and releasing sleeve relay. Arranged to absorb one digit before signaling an incoming call.

The functional equipment of the Code 101 Test Termination is mounted on a steel base measuring  $18\frac{3}{8}$  inches wide and  $6\frac{11}{32}$  inches high.

Order No.	Description	Price Each
<b>H-83207</b> (Option 1)	Used where intertoll trunks are loop pulsing type and office is equipped with rotary-type ringing machines. Answer lamps are battery connected. ....	
<b>H-83207</b> (Option 2)	Used where intertoll trunks are simplex pulsing type and office is equipped with rotary-type ringing machines. Answer lamps are battery connected. ....	
<b>H-83207</b> (Option 3)	Used where intertoll trunks are loop pulsing type and office is equipped with rotary-type ringing machines. Equipped with an answer lamp distributor relay and a night alarm lead. Answer lamps may be battery or ground connected. ....	
<b>H-83207</b> (Option 4)	Used where intertoll trunks are simplex pulsing type and office is equipped with rotary-type ringing machines. Equipped with an answer lamp distributor relay and a night alarm lead. Answer lamps may be battery or ground connected. ....	
<b>H-83207</b> (Option 5)	Used where intertoll trunks are loop pulsing and office is equipped with rotary-type ringing machines. Equipped with an answer lamp distributor relay and night alarm lead. Provides for delayed flashing line lamp. Answer lamps are ground connected. ....	
<b>H-83207</b> (Option 6)	Used where intertoll trunks are simplex pulsing and office is equipped with rotary-type ringing machines. Equipped with an answer lamp distributor relay and night alarm lead. Provides for delayed flashing line lamp. Answer lamps are ground connected. ....	

### Milliwatt Test Line Circuits

The Milliwatt Test Line Circuit is designed for one-way transmission testing of toll connecting trunks in 600-ohm office impedance. This test line circuit is connected to a one milliwatt 1000-cycle source for transmission testing.



The features provided in the Milliwatt Test Line Circuit are as follows: Provides idle circuit termination. Trips connector ring cut-off relay. Connects testing power for nine seconds and disconnects power for one second. This cycle is repeated continuously as long as the connection is held by the calling end.

The operational equipment of the Milliwatt Test Line Circuit is mounted on a steel base and can be provided to mount on a 19- or 23-inch rack.

Order No.	Description	Price Each
<b>DH-83063-A72A</b>	Mounts on 23-Inch Rack.....	<b>\$132.78</b>
<b>DH-83063-A74A</b>	Mounts on 19-Inch Rack.....	<b>96.97</b>

### Code 100, 102 and 103 Test Terminations

Code 100, 102 and 103 Test Terminations are used for testing of intertoll trunks. The equipment is rack mounted.

**Code 100** provides a termination for balance and noise testing. The features are as follows: Provides off-hook supervision to calling end as long as trunk is held by calling end. Provides a termination (600 ohms plus an MF capacitance) which simulates the nominal impedance of the incoming trunks under test.

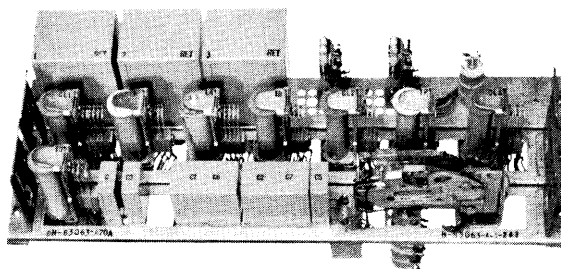
**Code 102** provides connection to a one milliwatt 1000-cycle source required for one-way transmission testing. The features are as follows: Returns an off-hook signal when the testing power is connected. Returns an on-hook signal and removes testing power after ten seconds. Provides an idle circuit termination in the on-hook condition.

**Code 103** provides termination required for overall tests of the signaling and supervisory features of intertoll trunks. The features are as follows: On seizure the test trunk returns an off-hook signal. On receipt of a ring forward (re-ring) signal the test trunk returns an on-hook signal. On receipt of second ring forward (re-ring) signal the test trunk returns 120 IPM flash.

The functional equipment of the Code 100, 102 and 103 Test Terminations is mounted on three steel bases which are joined together by two steel strips.

Overall dimensions: width, 18 $\frac{3}{8}$  inches; height, 6 $\frac{11}{32}$  inches.

Order No.	Description	Price Each
<b>DH-83063-A70A</b>	Consists of Code 100, 102 and 103 Test Terminations. Used where intertoll trunks use simplex pulsing.....	<b>\$242.85</b>
<b>DH-83063-A75A</b>	Code 102 Test Termination. Used where intertoll trunks use simplex pulsing.....	<b>128.52</b>
<b>DH-83063-A79A</b>	Consists of Code 100, 102 and 103 Test Terminations. Used where intertoll trunks use loop pulsing.....	<b>231.39</b>



### 81 DB Attenuators

The 81 DB Attenuator is a balanced 600-ohm attenuator which can be used in various ways when conducting transmission tests.

The Attenuator is made up of seven balanced resistance pads of the "O" (square) and "H" type. These are 600-ohm pads and provide a loss range of 0 to 81 db under control of seven turn keys.

This unit will dissipate 200 mw. continuously and 500 mw. for short periods without impairing accuracy after cooling.

The 81 DB Attenuator is housed in a portable box.

Dimensions: height, 4 inches; width, 8 inches; depth, 6 inches.

Order No.	Description	Price Each
<b>H-883924-1</b>	81 DB Attenuator.....	<b>*</b>

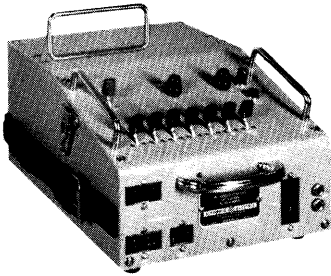
\*Price on application.

Prices are subject to change without notice.

R-7

## MF Pulsing Trunk Test Sets

The MF Pulsing Trunk Test Set is a portable test set designed for making operational tests directly on multi-frequency trunk circuits. It is useful primarily for investigation and clearance of trouble.



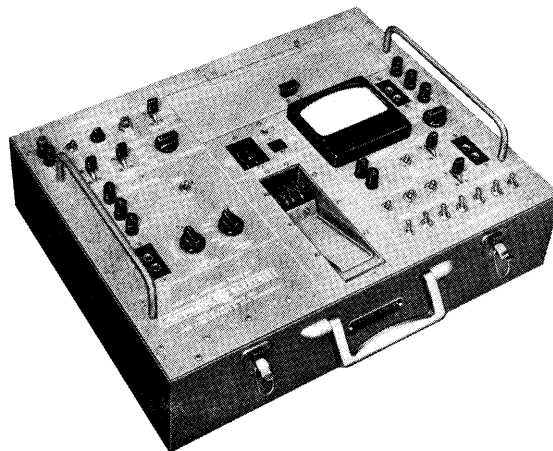
The following features are provided: Accesses multi-frequency trunks directly at trunk test jacks. Provided with lamp for trunk busy indication. Has facility for monitoring a trunk. Provided with keyset and MF supply for MF pulsing. Arranged to recognize supervisory signals such as seizure, stop-dial, re-order, ATB, and answer in the same manner as a toll board position. Provided with a jack for operator's headset for talking and receiving. Arranged so that dialing tests can be made without operator's headset being connected. Transmission battery is supplied from trunk under test on a simplex basis. Has jack and binding post for connecting a transmission measuring set.

The test set's functional equipment is housed in a sturdy metal case provided with a lock-on cover and carrying handle.

Dimensions: height, 7½ inches; width, 10 inches; depth, 12 inches.

Order No.	Description	Price Each
<b>H-884132-1</b>	MF Pulsing Trunk Test Set.....	<b>\$375.00</b>

## Negative Impedance Repeater Test and Installers' Sets



The Negative Impedance Repeater Test and Installer's Set (portable) contains all of the components to make repeater gain, Line Building Out, and return loss measurements. It is specifically designed to be used with the AT-6 Negative Impedance Repeaters.

Contains a built in H-88 (HC) Line Building Out unit to aid AT-6 repeater alignment on loaded facilities. Has provisions for connecting a precision network to aid in making structural return loss measurements. Can check AT-6 amplifier performance with the overload test contained. Contains a dial access for lines having a dialed termination available. Can check AT-2 and AT-3 as well as AT-6 standard repeater gain. Can measure separately the series section and shunt section gain of an AT-6 repeater, as well as the combined repeater gain.

Requires only 48-volt exchange battery.

Contains a built-in transistorized oscillator capable of being varied from 500 cps to 3,000 cps in 500 cycle steps. Or, the oscillator can be used as a sweep generator over the frequency

range of 2,000 to 3,000 cps. Contains a built-in transistorized detector for line repeater measurements. Oscillator and detector are equipped with jacks to permit external use.

Comes equipped with two cables. One 12-foot 8-conductor cable for connection to the repeater in the facility and for supplying 48-volt d-c power to the test set. One 6-inch, 4-conductor cable used for shorting out the network when making gain checks on the repeater.

Aluminum case with gray enamel finish; removable cover.

Dimensions: height, 17½ inches; width, 20 inches; depth, 7½ inches.

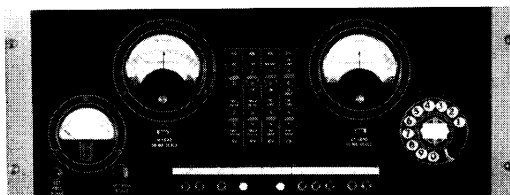
Weight, 27 pounds.

Order No.	Description	Price Each
<b>H-884426-1</b>	Negative Impedance Repeater Test and Installer's Set.....	<b>\$650.00</b>

REFERENCE: Technical Bulletin 854-523.



### Type 27A Signaling Test Sets



The Signaling Test Set is used in conjunction with a toll test board for checking and analyzing the signaling paths of toll or intertoll trunks which are equipped to send E and M, or other signaling.

The test set may be furnished either as a rack-mounted unit, which is attached to the toll test board, or as a portable unit. Equipment functions in both forms identically.

The test set, which provides a means for making a fast check of the intertoll trunk signaling system or the terminating trunk relay equipment, permits the test operator to perform the following test functions on the signal leads: monitoring, measurement of current, signaling, and measurement of percent make-percent break of pulses.

The Signaling Test Set in both rack-mounted and portable options (with the exception as noted) is furnished with the following cord assemblies as accessory equipment: two 3-conductor patch cords fitted with single plugs on each end; two 6-conductor patch cords fitted with twin plugs at each end; and one 2-conductor patch cord (portable test set only).

Control components for the test set comprise the following: a set of equipment conditioning, connecting, and pulsing lever keys; a push key for use in meter calibration; a variable pulsing-source, two milliammeter-sensitizing turn keys; and potentiometer knob.

Indicators include 3 milliammeters: 2 meters to measure currents of important leads, and 1 meter to show percent make-

break of pulses and the speed of the pulses from line and/or drop equipment.

A strip of jacks permit interconnecting the test set to its associated equipment.

The rack-mounted Signaling Test Set's equipment is mounted on a plastic faced wood panel which measures 23 inches wide and  $8\frac{23}{32}$  inches high. The test set's relay equipment is protected in use by removable metal covers.

The portable Signaling Test Set's equipment is housed in a metal case provided with a lock-on cover and a carrying handle. The unit's measurements are  $14\frac{3}{16}$  inches wide,  $8\frac{1}{2}$  inches high, and  $13\frac{15}{16}$  inches deep. Milliammeter sensitivity range is read on one of two scales—150-0-150 and 0-30-0.

Order No.	Description	Price Each
<b>H-885125-1</b>	Portable Signaling Test Set.....	<b>\$750.00</b>
<b>H-884986-1</b>	Rack-Mounted Signaling Test Set.....	<b>795.00</b>

REFERENCE: Technical Bulletin 100-709.

### Toll Pulse Repeating Test Sets

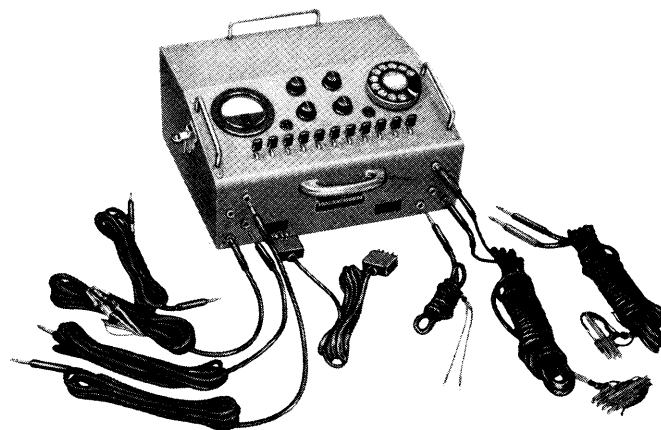
The Toll Pulse Repeating Test Set is a portable, self-contained unit used for testing of pulse repeating relays in toll and intertoll trunk circuits and in composite signaling circuits. This test set may be used alone, with the dial supplying trains of pulses, or in conjunction with a Varying Machine used as a pulse supply and/or with the Current Flow Test Set.

In addition to the points mentioned above, the Toll Pulse Repeating Test Set includes the following features: Provides a ratio meter to measure the pulse ratio being delivered by the test set or to measure pulses from the circuit under test. Provides for a pulse shifting arrangement to obtain pulses of a different ratio than that obtained from the dial or varying machine. Allows over-all pulsing test of polar duplex signaling circuits. Loop pulses, simplex pulses, or equivalent polar duplex dial leg pulses may be obtained from the test set.

The test set's equipment is housed in a sturdy metal case provided with a lock-on cover and a carrying handle.

Dimensions: width,  $14\frac{3}{16}$  inches; height,  $8\frac{1}{2}$  inches; depth,  $13\frac{15}{16}$  inches.

Weight, 25 pounds.

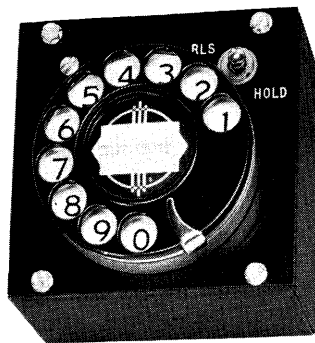


Order No.	Description	Price Each
<b>H-882794-1</b>	Toll Pulse Repeating Test Set.....	<b>\$695.00</b>

REFERENCE: Technical Bulletin 108-713.

Prices are subject to change without notice.

## Re-Ring Relay Test Sets



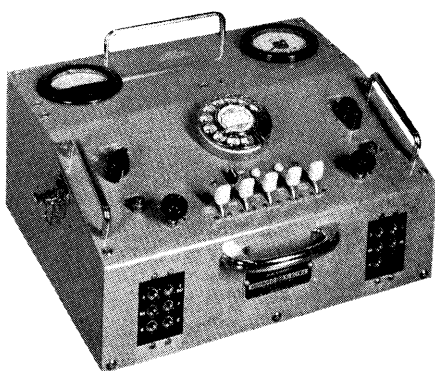
The Timing Test Set is a testing device to provide a means of testing the release times of the re-ring relay used in manual intertoll trunk circuits.

The test set consists of a specially designed dial, two relays, a toggle switch, and two 2-conductor cords with alligator clips at the test ends. The cords are fastened to the underside of the cover, brought through two holes in the lower portion of the rear of the test set, and secured by two clamps at the top portion of the rear of the test set.

The test set is contained in a metal box measuring 4 inches wide,  $3\frac{3}{16}$  inches high and 4 inches deep.

Order No.	Description	Price Each
<b>H-881933-1</b>	Re-Ring Relay Test Set.....	<b>\$57.00</b>

## Type 25 Signaling Test Sets



The Type 25 Signaling Test Set provides continuous on-hook, off-hook or dial controlled DC pulses on an "M" lead to a line signaling circuit or on an "E" lead to the connected drop equipment.

The unit is housed in a sloping panel cabinet with a cover. The panel contains controls and meters necessary for the various functions of the set. Jacks are provided for the connection of power and signaling leads and external meters.

This test set features an electronic interrupter which consists of two multi-vibrators (MV). One MV controls the pulse repetition of the other, which determines the relative operate and release time of a mercury contact relay.

Two panel switches control the pulsing speed and the per cent break of the internally generated pulses. Indication of pulsing speed and per cent break time are provided by two meters.

A single or a train of timed pulses of any number up to 10 may be produced under the control of an accurately adjusted dial. The test set also measures the per cent break of any externally generated pulses, including those passed through a single frequency unit under test.

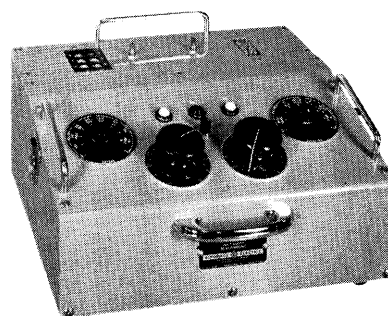
"E" and "M" lead supervision is provided by means of lamps.

Dimensions: height,  $8\frac{1}{2}$  inches; width,  $14\frac{3}{16}$  inches; depth,  $13\frac{1}{16}$  inches.

Order No.	Description	Price Each
<b>H-883355-1</b>	Type 25 Signaling Test Set.....	<b>\$705.00</b>

REFERENCE: Technical Bulletin 108-721.

## Type 24 Single Frequency Test Sets



The Type 24 Single Frequency Test Set serves as a junction unit for the application of a series of tests to single frequency signaling units in conjunction with the Type 25 Test Set and the Transmission Measuring Test Set. These tests are for adjustment, checking, and trouble shooting. The test set can be used on either 2400- or 2600-cycle signaling units. The test set can be used with +4 and -13 dbm, +7 and -16 dbm, or +4 and -4 dbm transmission levels.

The unit is housed in a portable, sloping panel cabinet with cover. The panel contains all necessary controls and indicators used in setting up the various test functions.

This test set provides means for connecting 2400 and 2600 cycles through the relay keyer to the signaling unit under test. The signals can then be adjusted and measured.

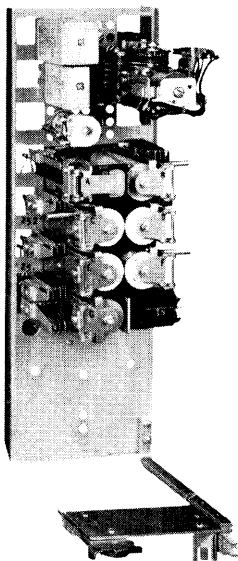
The test unit provides a means for connecting a fixed level 1000-cycle tone to the signaling unit under test. Also, provisions are made for mixing the 1000-cycle test tone with the 2400 or 2600-cycle tones.

It provides means for making pulsing tests and/or for controlling adjusting relay M of the signaling unit.

Dimensions: height,  $8\frac{1}{2}$  inches; width,  $14\frac{3}{16}$  inches; depth,  $13\frac{1}{16}$  inches.

Order No.	Description	Price Each
<b>H-883354-1</b>	Type 24 Single Frequency Test Set..	<b>\$600.00</b>

### Non-Synchronous Reverse Battery Test Line Equipment



The non-synchronous reverse battery test line equipment is arranged to provide distinctive tone and reversal flashes to identify correct terminal. It is used for rapid functional testing of connectors. It is also used for the application of marginal tests to connectors.

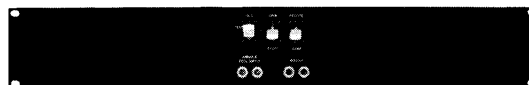
Starts to function after two complete ringing cycles.

Provides the following supervisory signals after two rings have been received: off-hook— $1\frac{1}{4}$  second; on-hook— $\frac{1}{2}$  second; off-hook— $1\frac{1}{2}$  second; 120 IPM—3 flashes; on-hook—2 seconds; off-hook— $5\frac{1}{2}$  seconds. (The 2 seconds on-hook and  $5\frac{1}{2}$  seconds off-hook signals are repeated until disconnect takes place.)

The equipment may be jacked in switch or rack-mounted.

Order No.	Description	Price Each
<b>DH-610036-40A</b>	Non-Synchronous Reverse Battery Test Line Equipment—jacked in switch.....	<b>\$126.96</b>
<b>DH-610036-70A</b>	Non-Synchronous Reverse Battery Test Line Equipment—rack mounted.....	<b>147.79</b>

### End Office Communication and Test Trunk Circuits



This circuit is designed to provide an end office communication and test trunk circuit for transmission testing.

The End Office Communication and Test Trunk Circuit provides the following features: Terminates on connector bank or line equipment. Arranged for insertion between line trunk equipment of a test desk, test panel, or test turret where end office is so equipped. Provides transmission testing via regular trunk to line equipment terminal number. Provides open circuit test (AC). Provides short circuit test. Provides termination test. Provides a 1000 cycle 1 milliwatt send test. (Requires external tone generator.) Provides jack for variable frequency send test. Provides receive jack for db or V.T.V.M. receive tests.

When no test desk or panel is equipped in the end office or they are not equipped with 2-way trunks to line equipment, this circuit will then provide the necessary operator's telephone equipment for communication and dialing by the addition of H-884585-5 to H-884585-4.

Either a regular telephone or operator's head set may be used for answering or calling.

The End Office Communication and Test Trunk Circuit is provided either as a turret measuring 9 inches wide,  $7\frac{3}{4}$  inches high, and  $6\frac{1}{8}$  inches deep; or as a panel in three sizes, one measuring  $11\frac{1}{8}$  inches wide by  $4\frac{1}{2}$  inches high which mounts within the jack field of a Type 1 Test Desk, another measuring  $22\frac{7}{8}$  inches wide by  $3\frac{1}{2}$  inches high which mounts in the jack field on the relay rack of a Type 180 Toll Test Panel, and the third measuring  $18\frac{3}{4}$  inches wide by  $4\frac{7}{8}$  inches high which mounts on a Type RA rack.

Order No.	Description	Price Each
<b>H-884585-1</b>	Turret.....	<b>\$90.00</b>
<b>H-884585-2</b>	Panel which mounts on rack of Type 1 Test Desk.....	<b>95.00</b>
<b>H-884585-3</b>	Panel which mounts on rack of Type 180 Toll Test Panel.....	<b>85.00</b>
<b>H-884585-4</b>	Panel for mounting on Type RA Rack.....	<b>100.00</b>
<b>H-884585-5</b>	Dial and Operator's Jack and Associated Equipment for use with H-884585-4.....	<b>53.20</b>

### Test Tone Generator 1000-Cycle, 1-Milliwatt Circuits and Distribution Circuits

The Test Tone Generator 1000-Cycle, 1-Milliwatt Circuit is designed to generate a sine wave voltage at a frequency of 1000 cycles per second to be supplied to a number of test outlets with an output of exactly one milliwatt in 600 and/or 900 ohms.

The features provided in the Test Tone Generator 1000-Cycle, 1-Milliwatt Circuit and Distribution Circuit are as follows: Provides for all testing applications in a telephone office requiring 1000-cycle tone. Supplies 1000-cycle tone to a number of test outlets simultaneously with an output of exactly 1 milliwatt in 600 and/or 900 ohms without any power loss. Provides reference power for calibrating test equipment of which the DB scales are based on 1 milliwatt in 600 ohms.

The functional equipment of the Test Tone Generator 1000-Cycle, 1-Milliwatt Circuit and Distribution Circuit mount on steel relay bases which mount on 19-inch racks. Test Tone Generator requires separate distribution network per application.

Order No.	Description	Price Each
<b>DH-850296-A70A</b>	Test Tone Generator 1000-Cycle, 1-Milliwatt Circuit .....	<b>\$195.00</b>
<b>DH-850296-A73A</b>	Distribution Network for 600-Ohm Office .....	<b>135.00</b>
<b>H-886126-1</b>	Distribution Network for 900-Ohm Office (1 circuit) .....	<b>37.19</b>
<b>H-886126-2</b>	Same as H-886126-1, but with 2 circuits .....	<b>62.86</b>
<b>H-886126-3</b>	Same as H-886126-1, but with 3 circuits .....	<b>88.53</b>
<b>H-886126-4</b>	Same as H-886126-1, but with 4 circuits .....	..*
<b>H-886126-5</b>	Same as H-886126-1, but with 5 circuits .....	..*
<b>H-886387-1</b>	Distribution Network for 900-Ohm Office for use where DH-85893-71A Tone Generator is source (1 circuit) .....	..*
<b>H-886387-2</b>	Same as H-886387-1, but with 2 circuits .....	..*
<b>H-886387-3</b>	Same as H-886387-1, but with 3 circuits .....	..*

\*Prices will be furnished on request.

### End Office Transmission Test Circuits

The End Office Transmission Test Circuit is designed to provide end office transmission test equipment applied to connector terminals with options for multi-frequency test, stability test, combined 1,000-cycle and loop-around tests, or 1,000-cycle termination and loop-around test. Circuit options lend flexibility to end office transmission testing.

Provides access by dialing a local connector test code; two connector terminal access points are provided. Provides for testing in a 900-ohm office. Provides for one-way and loop-around transmission tests. Provides open circuit test. Provides short circuit test (A-C). Provides access from Transmission Test Connector. Provides for control of up to ten different frequency test tones. These frequencies include 300, 500, 1,000, 1,500, 2,000, 2,300, 2,500, 2,800, and 3,000 cycles. Provides a 1,000-cycle, 1-milliwatt test tone send test.

The functional equipment of these circuits is rack mounted.

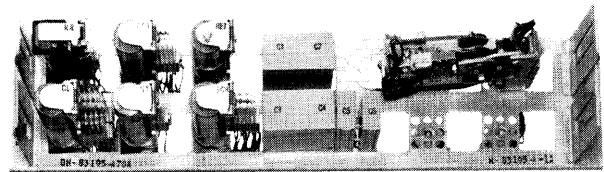
(NOTE: Requires external tone generator.)

Order No.	Description	Price Each
<b>DH-83243-70A</b>	Connector Access and Loop-Around Test Relays Circuit .....	<b>\$222.96</b>
<b>DH-83243-71A</b>	Connector Access and Loop-Around Test Relays Circuit and Frequency Sequence Switch .....	<b>246.46</b>
<b>DH-83243-72A</b>	Stability Check Relays Circuit .....	<b>74.08</b>
<b>DH-83243-73A</b>	1000-Cycle, Stability Check, and Loop-Around Test Relays Circuit .....	<b>193.44</b>
<b>DH-83243-75A</b>	Connector Access and Loop-Around Test Relays Circuit, Frequency Sequence Switch and Stability Check Relays Circuit .....	<b>186.24</b>

## Test Line Circuits

### For Local Offices

Order No.	Description	Price Each
<b>DH-580314-31A</b>	Transmission Test Connector Circuit .....	<b>\$214.79</b>

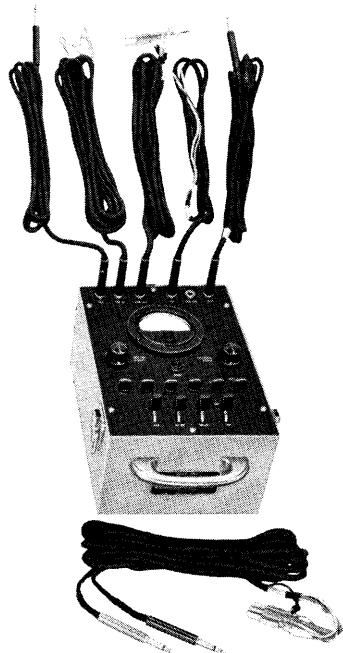


Order No.	Description	Price Each
<b>DH-83195-A76A</b>	Termination connected to a 1-milliwatt 1000-cycle source for one-way transmission tests . . . .	<b>\$93.30</b>
<b>DH-83195-A77A</b>	Open circuit termination . . . . .	<b>68.14</b>
<b>DH-83195-A78A</b>	Short circuit termination . . . . .	<b>67.10</b>
<b>DH-83195-A79A</b>	Balance circuit termination . . . . .	<b>68.38</b>
<b>DH-83195-700A</b>	Stability check . . . . .	<b>105.34</b>

## A black and white photograph of a vintage handheld flashlight. The flashlight has a cylindrical body with a textured grip and a lens at the front. A coiled cable is attached to the back, ending in two connectors. A small rectangular component, possibly a battery or a switch, is shown separately next to the flashlight.

Order No.	Description	Price Each
<b>L-9066-CF</b>	Type 800 Hand Test Telephone . . . .	<b>\$25.00</b>
<b>D-543392-A</b>	Cord & Test Plug Assembly (for use with standard & TWX circuits) . . .	<b>4.75</b>
<b>D-543395-A</b>	Cord & Alligator Clip Assembly . . . .	<b>2.40</b>
<b>D-543142-A</b>	Cord & Switchboard Plug Assembly . .	<b>4.75</b>
<b>D-780869-A</b>	Frame mounting Bracket . . . . .	<b>.35</b>

**R-13**



### Local Pulse Repeating Test Sets

The Local Pulse Repeating Test Set is a portable, self-contained unit which permits the testing of pulse repeating relays in local interoffice trunk circuits and toll transmission selectors. The test set is used in conjunction with a Varying Machine and may be used with a Current Flow Test Set for making current flow measurements through the pulse repeating relay after the relay has been readjusted to pulse within the proper limits.

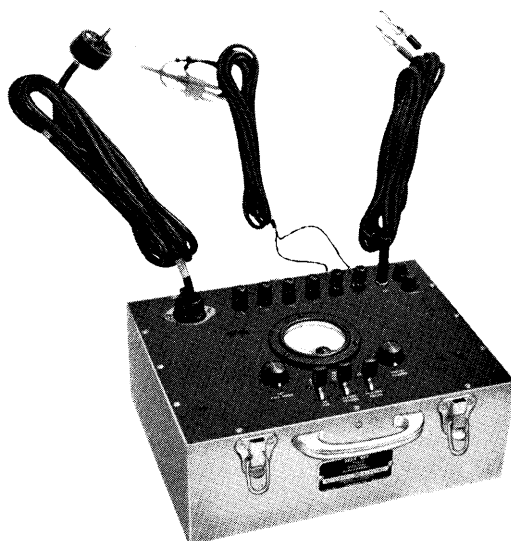
The test set is equipped so that maintenance personnel can: Add spark suppression when testing toll transmission selectors. Insert a resistance to simulate the subscriber's loop on the input side of the pulsing relay under test. Set up an artificial trunk from 0 to 3500 ohm. See when the equipment to be tested is busy. Measure per cent break of the Varying Machine pulses or any other circuit, if desired.

The test set's equipment is housed in a metal case provided with a lock-on cover and a carrying handle.

Dimensions: width,  $7\frac{7}{16}$  inches; height,  $6\frac{3}{16}$  inches; depth,  $10\frac{3}{16}$  inches.

Order No.	Description	Price Each
<b>H-883339-1</b>	Local Pulse Repeating Test Set.....	<b>\$395.00</b>
REFERENCE: Technical Bulletin 108-715.		

### Pulse Speed and Percent Break Test Sets



The Pulse Speed and Percent Break Test Set is a self contained portable test set used to measure the pulsing speed of relays, the operating speed of automatic stepping mechanisms, and percent break of the pulsing contacts of relays. This test set is equipped to measure the speed and per cent break of loop, ground, or battery pulses.

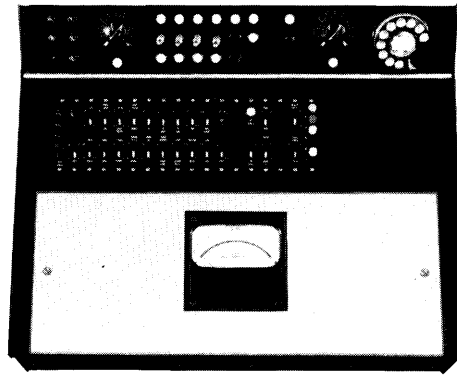
The Pulse Speed and Percent Break Test Set tests: speed of dials, output rate of pulse generating relays, quality of line input pulses to exchange equipment, and quality of output pulses of pulsing devices such as repeaters.

The controls, indicators, and jacks are mounted on the control panel within easy reach of the tester. All cords used to interconnect the test set and the equipment to be tested are supplied with the test set. The test set uses 115-volt, 50 or 60-cycle alternating current as a pulse speed standard for calibration purposes.

The test set's equipment is contained in a metal case provided with a latch-type cover and carrying handle.

Dimensions: width  $12\frac{1}{2}$  inches; height,  $7\frac{7}{16}$  inches; depth,  $9\frac{1}{2}$  inches.

Order No.	Description	Price Each
<b>H-883227-1</b>	Pulse Speed and Percent Break Test Set.....	<b>\$285.00</b>
REFERENCE: Technical Bulletin 108-718.		

**Type 180L Local Test Panels**

The Type 180L Local Test Panel is a relay rack mounted local test facility consisting of a lower unit, a jack field, and optional test components. Its primary purpose is the testing of lines and trunks on which trouble has been reported. However, it is also used to routine test subscriber lines (a form of preventative maintenance enabling a test attendant to discover line trouble before it becomes serious).

Testing connections are made via lower unit test cords (primary, auxiliary, and sounder) plugged into trunk jacks located on the test panel jack field. The test attendant may establish a test connection to a subscriber's line over trunks to test distributor or test lines to MDF. An inspector or installer outside the exchange may call the test panel (over inspector's trunks) to request that tests be made on a line. Other jack-ended trunks are also available; such as trunks to other desks, trunks to toll board, 101 code trunks, and extra cable pair lines.

After connection with a line is made, the test attendant can make a variety of tests on the line by operating various keys and controls located on the lower unit. Results of these tests are read from a volt-ohm-milliammeter located on the lower unit.

Listed below are some of the testing functions provided by the Type 180L Local Test Panel.

**Tests made using the primary test cord:**

**VOLTMETER TESTS**—measures potentials on lines or trunks; check for short circuits, grounds, and open lines; check for foreign potentials on either side of the line; and check exchange and test battery voltage.

**RESISTANCE MEASUREMENTS**—made by ohmmeter or Wheatstone bridge methods.

**CURRENT MEASUREMENTS**—for margining coin box relays with current sent out from the test panel and read on the meter.

Type 180L Local Test Panels are not a stock item, but must be engineered per individual requirements.

REFERENCE: Technical Bulletin 211-604.

**INSULATION BREAKDOWN TESTS**—A 200-volt battery is used on insulation breakdown tests to reproduce voltage stress conditions that are encountered on lines during ringing and paystation coin control periods.

**Tests made using auxiliary test cord:**

**HOWLER**—howler tone can be placed on a line to attract the attention of a subscriber who has left his handset off the cradle.

**SIGNALING**—provides a key which allows signaling of the distant telephone (also provided with primary test cord circuit).

**DIAL SPEED TEST PANEL**—used to measure dial speed, to check dial pulse springs for normal operation, to check party identity of ten-party SATT dials, and to verify that the digit "0" is dialed by counting digits when checking party identity.

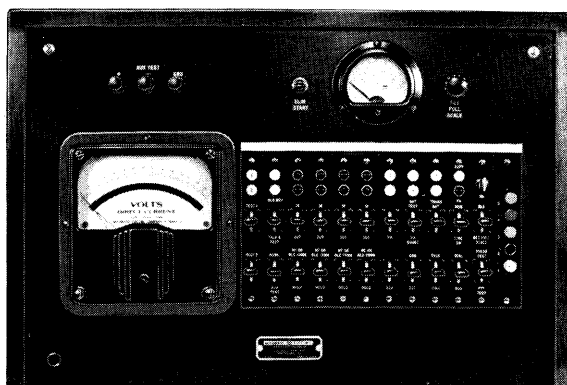
**Tests made using sounder test cord:**

**SOUNDER**—permits repairman to signal the test attendant via the sounder, over a line connected to the sounder circuit.

**DIAL TONE**—used as an outgoing signal to a repairman to help him locate a particular pair, etc.

The test panel equipment mounts on sections of relay rack 24 $\frac{3}{4}$  inches wide and 9'0" or 11'8" high. The lower unit mounts on the face of the relay rack such that its keyshelf is 40 inches above the floor. The jack field and optional test components (dial speed test panel, howler, etc.) mount above the lower unit.

## Type 21A Wire Chiefs Test Units



The Type 21A Test Unit is designed to test and locate trouble on subscriber's lines, interoffice trunk circuits, and associated central office equipment. Tests are made by connection through a switchtrain (test distributor and test connectors), connection at the main distributing frame (MDF), connection via an incoming trunk from a selector level (inspector's trunk), or connection via trunks to a manual board. The Type 21A Test Unit may be used in exchanges of 1000 lines or less, or in P-A-B-X's of any size.

The test unit is arranged to receive and originate regular two-way service calls between a test attendant in the exchange, and subscribers, inspectors, installers, or other company employees outside the exchange. This feature is independent of the test circuit and is accomplished via regular automatic line equipment and a connector terminal, or via manual line equipment and switchboard inter-position trunks. The test unit is also equipped with one inspector's trunk incoming from a selector level. This trunk allows inspectors, installers, and repairmen, to dial in to the attendant, and is connected to the test circuit for making tests when the attendant answers. The test unit is wired and may be equipped with up to four trunks to MDF and/or test distributors.

Tests devised to check for various line or trunk troubles are controlled by lever keys which complete a circuit to a voltmeter. By operating the proper keys; line potentials, continuity, capacitance, and insulation resistance are determined from the indicated meter readings.

The test unit is also designed to perform the following routine operational functions:

TALKING—establishes a talking circuit for connection to a subscriber, installer, or outside testman.

MONITORING—enables the test attendant to monitor each line or trunk for a busy condition before proceeding with tests.

HOLDING—provides for holding a connection through a test trunk to a line under test while the attendant performs other duties.

RINGING—provides for ringing on the line or trunk to signal a repairman at the line under test.

DIAL SPEED—permits checking the speed of a subscriber's dial to insure correct pulsing.

HOWLER—notifies a subscriber via howler tone that the receiver has been left off-hook.

OPEN GEN GRD—allows ringing of subscriber's telephone if howler tone is ineffective.

NIGHT ALARM—the night alarm sounds when any of the test unit lamps are lighted when the attendant is away from the test unit.

Dimensions: height, 14 $\frac{1}{4}$  inches; length, 21 $\frac{1}{2}$  inches; depth, 14 $\frac{13}{16}$  inches.

Weight, 66 pounds.

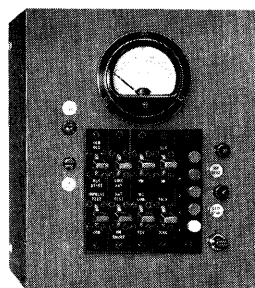
The order number for a fully equipped test unit with the following variations is as follows:

Order No.	Description	Price Each
<b>H-884298-1</b>	Unit equipped with 2 trunks to MDF or test distributor.....	<b>\$780.00</b>
<b>H-884298-2</b>	Unit equipped with 3 trunks to MDF or test distributor .....	<b>810.00</b>
<b>H-884298-3</b>	Unit equipped with 4 trunks to MDF or test distributor.....	<b>840.00</b>
<b>H-884298-4</b>	Unit equipped with 2 trunks to MDF or test distributor and OPEN GEN GRD key.....	<b>790.00</b>
<b>H-884298-5</b>	Unit equipped with 3 trunks to MDF or test distributor and OPEN GEN GRD key.....	<b>820.00</b>
<b>H-884298-6</b>	Unit equipped with 4 trunks to MDF or test distributor and OPEN GEN GRD key.....	<b>850.00</b>

REFERENCE: Technical Bulletin 211-405.



## Type 22 Wire Chiefs Test Units



The Type 22 Test Unit (portable) is designed to test and locate trouble on subscriber lines, interoffice trunk circuits, and associated central office equipment. The set has particular application in small type exchanges up to 400 lines not equipped with test connectors (automatic or manual), local or central office battery, and in unattended community dial offices.

The test unit is arranged to receive and originate regular two-way service calls between a test attendant in the exchange, and subscribers, inspectors, installers, or other company employees outside the exchange. This feature is independent of the test circuit and is accomplished via regular automatic line equipment and a connector terminal, or via manual line equipment and switchboard interposition trunks.

Tests which check for the different line or trunk troubles are controlled by lever keys which complete a circuit to the voltmeter. By operating the proper keys, line potentials, continuity, capacitance and insulation resistance are determined from the indicated meter readings.

The test unit is also arranged to perform the following routine operational tests:

**TALKING**—establishes a talking circuit for contact to a subscriber, installer, or outside testman.

**MONITORING**—enables the test attendant to discover a plugged up line or trunk before proceeding with the test.

**RINGING**—provides a means for ringing on the line when the line is plugged up.

**DIAL SPEED**—permits checking the speed of a subscriber's dial to insure correct pulsing.

**HOWLER**—notifies a subscriber by a loud tone that the receiver has been left off the hookswitch.

**R OFF HOOK**—allows ringing of subscriber's telephone if howler tone is ineffective.

Dimensions: height, 10 $\frac{1}{2}$  inches; width, 8 $\frac{1}{2}$  inches; depth, 5 $\frac{1}{4}$  inches.

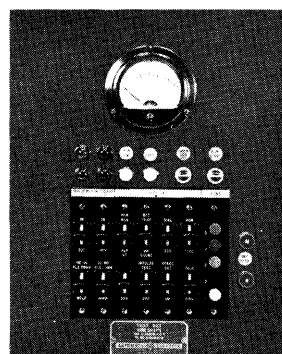
Weight, 9 pounds.

Order No.	Description	Price Each
<b>H-884286-1</b>	Unit equipped with 5 harmonic ringing keys.....	<b>\$255.00</b>
<b>H-884286-2</b>	Unit equipped with single frequency ringing.....	<b>230.00</b>
<b>H-884286-3</b>	Unit equipped with 5 harmonic ringing keys (R.E.A.).....	..*
<b>H-884286-4</b>	Unit equipped with single frequency ringing (R.E.A.).....	..*

\*Price on application.

REFERENCE: Technical Bulletin 211-476.

## Type 23 Wire Chiefs Test Units



The Type 23 Test Unit (portable) is designed to test and locate trouble on subscriber's lines, interoffice trunk circuits, and associated central office equipment. The set is similar (in appearance and function) to the Type 22 Test Unit except that tests are made by connection through a switchtrain (test distributor or test connector) or by connection at the main distributing frame (MDF). The Type 23 Test Unit may be used in automatic or manual exchanges equipped with local or central office battery, or in unattended community dial offices.

The test unit is arranged to receive and originate regular two-way service calls between a test attendant in the exchange, and subscribers, inspectors, installers, or other company employees outside the exchange. This feature is independent of the test circuit and is accomplished via regular automatic line equipment and a connector terminal, or via manual line equipment and switchboard inter-position trunks.

Tests which check for the different line or trunk troubles are controlled by lever keys which complete a circuit to a voltmeter. By operating the proper keys, line potentials, continuity, capacitance, and insulation resistance are determined from the indicated meter readings.

The test unit is also arranged to perform the following routine operational tests:

**TALKING**—establishes a talking circuit for immediate contact to a subscriber, installer, or outside testman.

**MONITORING**—enables the test attendant to monitor each line or trunk for a busy condition before proceeding with the test.

**RINGING**—provides a means for ringing on the line or trunk to signal a repairman stationed at the line or trunk equipment under test.

**DIAL SPEED**—permits checking the speed of a subscriber's dial to ensure correct pulsing.

**HOWLER**—notifies a subscriber by a loud tone that the receiver has been left off the hookswitch.

**OPEN GEN GRD**—allows ringing of subscriber's telephone if howler tone is ineffective.

Dimensions: height, 13 $\frac{3}{8}$  inches; width, 10 $\frac{3}{4}$  inches; depth, 5 $\frac{5}{8}$  inches.

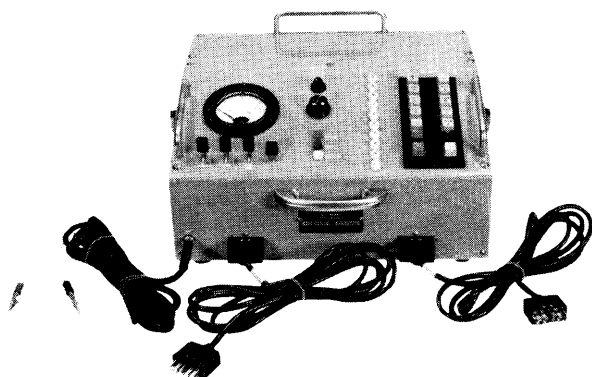
Weight, 15 pounds.

Order No.	Description	Price Each
<b>H-884297-1</b>	Unit equipped with 5 harmonic ringing keys.....	<b>\$380.00</b>
<b>H-884297-2</b>	Unit equipped with single frequency ringing.....	<b>355.00</b>
<b>H-884297-5</b>	Unit equipped with 5 harmonic ringing keys (R.E.A.).....	..*
<b>H-884297-6</b>	Unit equipped with single frequency ringing (R.E.A.).....	..*

\*Price on application.

REFERENCE: Technical Bulletin 211-477.

## Impulse Sender Test Sets



The Impulse Sender Test Set is a portable unit designed to check the various functions of the impulse sender associated with the Type 31C tollboard. Furnished with the test set are two ten-conductor cords with Jones-type plugs for connecting the test set to the impulse sender. The test set is equipped with keysets arranged as Automatic Electric Company standard or the Bell standard. Both keysets are equipped with a twelve-terminal radio-type socket for easy removal from the test set.

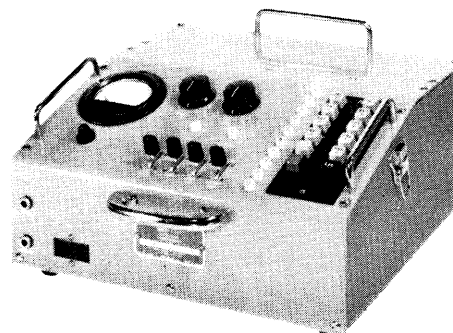
The test set checks the following operations of the impulse sender: seizure, pulse ratio, pulse speed, sending by displaying keyed digits on lamp strip, disconnect, disconnect from flash busy or open sleeve condition, and stop dial.

The test set's functional equipment is housed in an aluminum case equipped with a metal carrying handle and removable latch-type cover. The cabinet is finished in gray enamel.

Dimensions: width,  $14\frac{3}{16}$  inches; height,  $8\frac{1}{2}$  inches; depth,  $13\frac{5}{16}$  inches.

Order No.	Description	Price Each
<b>H-882759-1</b>	Equipped with Automatic Electric Company keyset arrangement . . .	<b>\$440.00</b>
<b>H-882759-2</b>	Equipped with Bell System keyset arrangement . . . . .	<b>440.00</b>

REFERENCE: Technical Bulletin 108-717.

Routine Test Sets  
For Impulse Senders and Digit Relays

The Routine Test Set for Impulse Senders and Digit Relays is a portable test set used to test impulse-sender and digit-relay equipment used with the Type 31B and Type 30 Toll Boards.

This test set provides means to test impulse-sender and digit-relay functions as follows: keyset and lamp-display, to send a number and verify the correctness of the sending of each digit; stop-in-dialing; error release; and pulse ratio and speed.

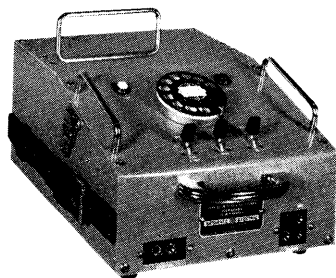
All functions above are tested with the test set connected to the sender shelf test jack except for ratio and speed which are tested by plugging into the impulse-sender test jack, causing the impulse-sender to pulse continuously.

Tests of pulse repeating relays in trunk circuits can be made by using a test cord connected to the test set pulse jack.

This portable test set consists of a gray metal cabinet assembly (with lock-on cover and a carrying handle) in which are mounted the functional components (keyset, lamps, keys, etc.).

Dimensions: width,  $14\frac{3}{16}$  inches; height,  $8\frac{1}{2}$  inches; depth,  $13\frac{5}{16}$  inches.

Order No.	Description	Price Each
<b>H-883109-1</b>	Routine Test Set for Impulse Senders and Digit Relays . . . . .	<b>\$440.00</b>

Portable Test Sets  
For Type 31 Toll Board Trunks

The Portable Test Set for Type 31 Toll Board Trunks connects to the test jacks of the various trunk circuits permitting the maintenance man to make operational tests of the trunks without going to the toll board position.

This test set has features similar to the cord, position, and telephone circuits of the Type 31 toll board and provides facilities for testing the following trunk operations: busy test, monitoring busy trunks, dialing toll switchtrains (loop dialing), ringing, supervision, talking, and pad control.

The test set consists of a metal cabinet assembly (with lock-on cover and a carrying handle) in which are mounted the components (dial, lamps, keys, jacks, etc.).

Dimensions: width,  $10\frac{3}{16}$  inches; height,  $8\frac{1}{8}$  inches; depth,  $12\frac{13}{16}$  inches.

Order No.	Description	Price Each
<b>H-884550-1</b>	Portable Test Set for Type 31 Toll Board Trunks . . . . .	<b>\$320.00</b>

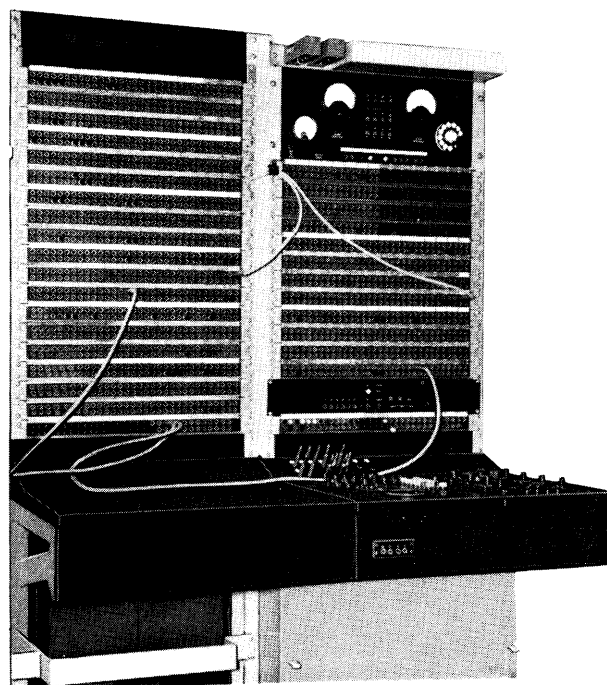
## **Type 180 Toll Test Panels**

The Type 180 Toll Test Panel is a relay rack mounted toll test facility consisting of one or more lower units, a single-jack jack field, and optional test components.

Optional test equipment, consisting of test sets and auxiliary components, is both portable and rack-mounted. It provides facilities for the testing of toll trunks and their associated manual or automatic access circuits. Due to flexibility of design and availability of optional test equipment, the test panel can be supplied so as to constitute a maximum or minimum toll test facility.

Additional test capabilities can be added to the test panel without disturbing those facilities provided originally.

Toll testing operations conducted at the test panel may be classified as primary or secondary, and tests may be made in the direction of the line or the drop. The primary test facilities of the test panel enable the test attendant to access the tip and ring conductors of a toll trunk directly for trunk tip or ring testing, location of trunk faults, signaling, current or voltage measuring, and trunk monitoring purposes. The secondary test facilities of the test panel enable a test attendant to make overall tests on a toll trunk.



The test panel can be equipped to provide any or all of the following primary and secondary toll testing functions:

### **Primary Testing Functions**

Analyzing and determining the nature of trouble on a toll line or trunk by using a volt-milliammeter to measure tip or ring potentials, potentials to ground, bridge capacitance, insulation resistance, and for related tests.

Locating a shorted or grounded portion of a toll line through use of a precision Wheatstone bridge.

Locating an open on a toll line through use of a Wheatstone

bridge and a 4-cycle interrupter.

Extending transmission battery or 20-cycle ringing current to the trunk for use by outside test personnel, or as required.

Measuring the current or voltage in a dial or telegraph leg associated with the trunk.

Talking on the primary trunk by the test attendant.

### **Secondary Testing Functions**

Access to the over-all trunk in a manner equivalent to that of the toll board operator for the determination of the nature and approximate location of any trouble on a toll trunk, should trouble occur.

Routining of the overall trunk for transmission, ringing,

pulsing, and supervision.

Busy condition holding, so that auxiliary test equipment may be connected to the trunk for sectionalized or overall tests on the trunk.

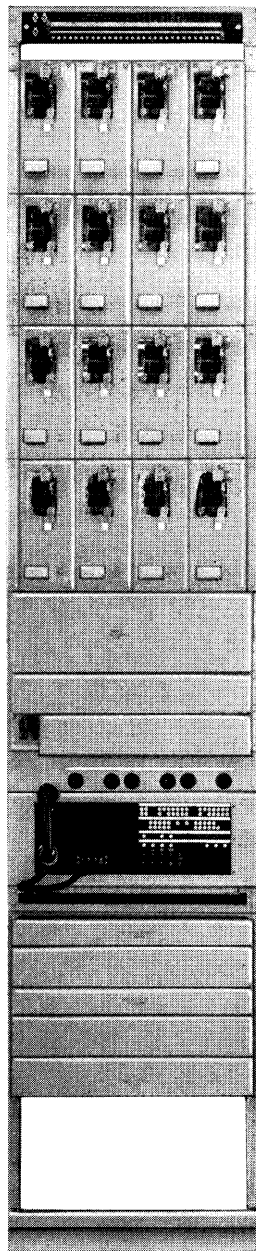
The lower unit, jack field, and auxiliary test components mount on sections of relay rack 24 $\frac{3}{8}$  inches wide and 9'0" or 11'8" high. The lower unit is mounted on the face of one section of relay rack such that its keyshelf is 37 $\frac{1}{8}$  inches above the floor. The number of sections of relay rack required to mount the test panel depends on the size of the jack field, the customers jack layout plan, and auxiliary test equipment required. Two sections of relay rack are required to mount the average test panel. If more than two sections are required, the test panel may be equipped with two or more lower units. The overall physical appearance of the test panel may therefore vary from office to office, due to the number of relay rack sections required, number and location of lower units, arrangement of the jack field, and auxiliary test equipment supplied.

Type 180 Toll Test Panels are engineered and manufactured to order. Call us for assistance in preparing your specifications.

REFERENCE: Technical Bulletin 211-605.

Prices will be furnished on request.

## Automatic Equipment Routiners



Designed to allow functional testing of switching equipment in a step-by-step telephone central office. The routiner provides up to four test groups which permit maintenance personnel to test the following: finder-first selector combinations, intermediate selectors (seconds, thirds, etc.), local connectors, and toll connectors and local interoffice repeaters.

Connection to the switch to be tested is made via rotary access switches. The banks of these switches are connected to secondary access switches for all tests except first selectors, which are connected through line finders. The secondary access switches in all cases are regular selectors modified for operation with the routiner. They are available for regular service when not in use by the routiner and are part of the switching rank preceding switches or trunks to be tested.

The basic routiner can be equipped with a maximum of 16 rotary access switch units, each of which may access up to 24 secondary switches. The routiner can be expanded to include a maximum of 25 rotary access switch units per test group. This expansion feature provides the routiner with a total secondary access switch capacity of 2400 units.

When testing through a selected test group, the routiner tests each switch individually stepping past busy switches and stopping only when a test requirement is not met or when routing through the selected test group is completed.

Features: Provides an automatic preset circuit to select the group, rotary access switch, rotary access switch positions, and particular level of access

selector from which office routing is to start. Restart testing by key operation after a fault is detected. Progress lamps for supervision of routiner are provided; also preset, busy, etc. supervisory lamps. A synchronous motor is used for "out-pulsing" digits. Provides for out-pulsing of ten different ten-digit numbers for repeater testing. Detects absence of overflow tone from access selectors. Equipped with a transistorized tone detector. Provided with a talk and transistorized monitoring circuit for individualized testing. Whenever a fault is encountered, routing stops and an alarm sounds.

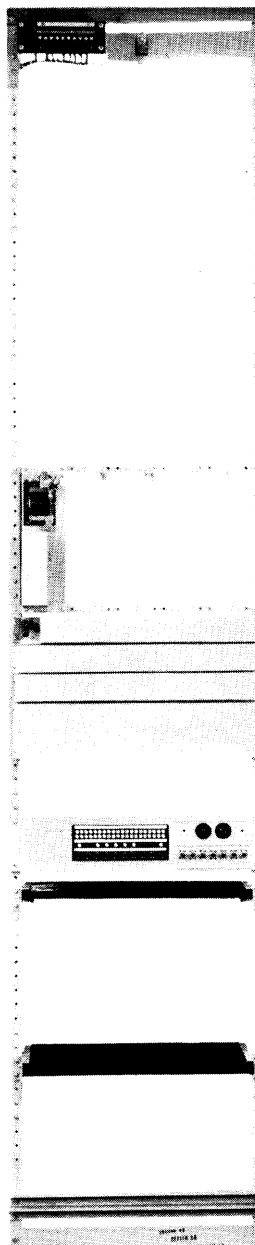
The printroller described on page R-21 is available for print out use with this equipment.

All equipment performing routing function is built into self-contained relay assemblies. Assemblies are mounted on a steel rack measuring 34 in. wide, and 140 in. high.

Engineered to specific requirements. Call us for assistance in preparing your specifications.

REFERENCE: Technical Bulletin 211-450

## Type 2A Automatic Line Insulation Routiners



Designed for unattended operation with step-by-step office equipment to detect faulty line insulation. All functions of the routiner are initiated from a test panel which houses the necessary controls and visual indicators. Transistorized fault detection circuits make possible early detection of incipient line faults. The lines under test are accessed through test distributors and test connectors; a rotary access switch provides an economical means of marking the test connectors with which the routiner must function. Tests are made at approximately 30 lines per minute through a maximum of 10 offices (10,000 lines each); these offices may be routined singly or in sequence. An automatic printer furnishes a running and permanent record on tape of any detected line faults.

Includes the following features: The routiner has the equivalent of a test distributor trunk circuit to eliminate the need for a separate trunk circuit for each accessed test distributor. Lamps are provided to indicate routing progress, busy test connectors and distributors, and types of faults encountered (battery, ground, or loop). A stop-on fault feature causes the routiner to stop when a fault is detected and results in a visual indication and if desired, sounds an audible alarm. Key allows the starting of tests at any desired hundred group. Marking equipment permits the skipping of vacant 1,000 or 100-line groups and allows the routiner to function with 100-line, 200-line, two or three-digit test connectors.

A fault detection circuit provides 5 sensitivity levels for testing line insulation: 50,000 ohms, 100,000 ohms, 250,000 ohms, 500,000 ohms, and 1 megohm.

The routiner camps on busy test connectors until the connector is released or the routiner is made to manually bypass the busy test connector. The routiner restarts automatically after read out of the faulty line condition.

Consists of a fuse panel, auxiliary signal equipment, rotary access switches, common test equipment, test panel, a writing shelf, and a readout printer. All are mounted on a relay rack. Relay rack measures 28 $\frac{3}{4}$  inches wide and is available in two heights 108 and 140 inches.

Order No.	Description	Price Each
<b>H-884627-1</b>	Mounted on 9'0" Rack.....	
<b>H-884627-2</b>	Mounted on 11'8" Rack.....	

REFERENCE: Technical Bulletin 211-451.

## Printrollers

The Printroller is an optional piece of equipment which may be electrically connected between older and present models of the Automatic Equipment Routiner and between older models of the Automatic Line Insulation Routiner (H-85102 and H-85165) and an electric printing machine. This equipment provides the necessary controls to print out on tape a record of all faulty line conditions detected by the routiner.

The Printroller also has provisions for initiating visual or audible alarms when a line insulation fault is detected. After a fault is read out, the Printroller automatically restarts the routiner.

When the associated routiner locates a faulty line condition, the Printroller functions to transfer the number of the office under test to the printer. A rotary switch identifies the faulty line and sequentially feeds the line number to the printer for recording. The Printroller supplies a two-digit trouble code to the printer to identify the type of line fault encountered. After completion of fault readout and printing, the Printroller automatically restarts the routiner.

A printed record of detected line faults may be maintained for a maximum of 9 offices.

A self-checking feature in this system monitors the functioning of the line insulation routiner. A routiner malfunction causes the Printroller to stop the routiner, feed the fault information to the printer and initiate either an audible or visual alarm. In this case, the Printroller does not restart the rou-

tinier automatically and routing progress stops until manually initiated.

All Printroller relays and the rotary switch are mounted on two relay mounting bases which are joined by a backing strip to make one integral unit. The entire unit is  $18\frac{3}{4}$  inches long and measures  $8\frac{1}{4}$  inches high; this assembly mounts on standard 18-inch relay racks.

All internal wiring is brought to a terminal block through which connections are made to the routiner, printer and exchange equipment.

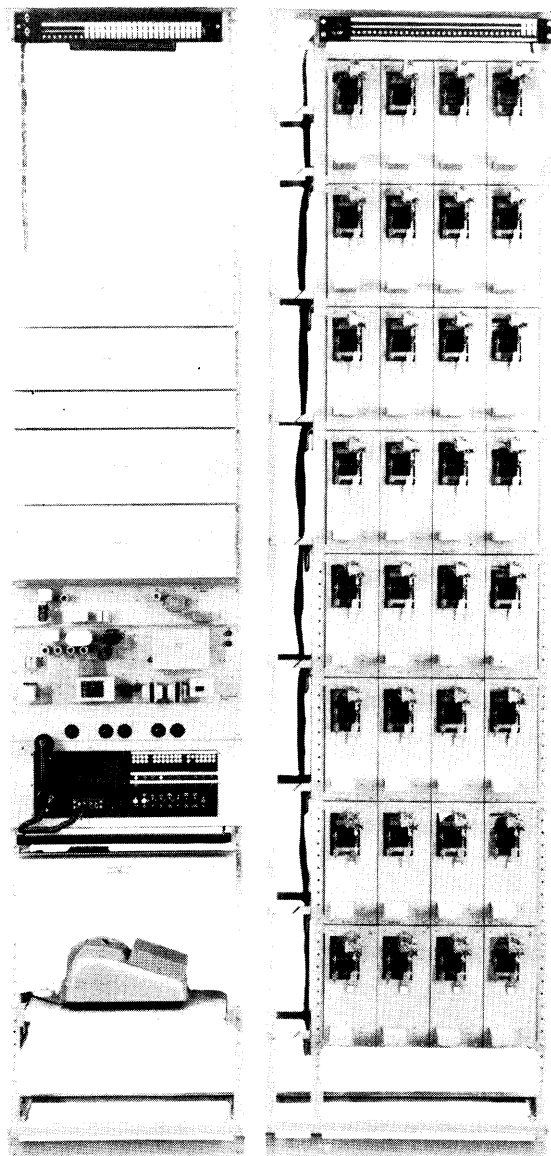
This Printroller is used with a Clary readout printer and may be used with Automatic Line Insulation Routers (circuit numbers H-85102 or H-85165).

Order No.	Description	Price Each
<b>RG-5345A</b>	Printroller.....	<b>\$315.22</b>
<b>D-555024A</b>	Clary Readout Printer.....	<b>596.50</b>

Uses any standard commercial adding machine tape that is  $2\frac{1}{4}$  inches wide.

REFERENCE: Technical Bulletin 211-451.

## Automatic Trunk Routers with Transmission Loss Measuring



Designed to detect faulty operation of trunk circuits. All functions are initiated from a control panel which houses necessary controls and visual indicators. Access to trunks is made via rotary switches. Trunk router can consist of a maximum of 8 racks of access equipment; each rack having a maximum of 32 access switches; each switch may access a maximum of 24 trunk circuits. A router may access a maximum of 6,144 trunk circuits.

Conducts routine tests on trunks associated with only one distributor switch or any desired combination of distributor switches.

Automatically routines a maximum of 25 different selector level access outgoing dial trunks with markings provided by the access switch for any of the following trunk variations: Loop or simplex seizure. Loop, simplex, or multifrequency pulsing. Reverse battery and/or "EC" lead supervision. Return of ground on "C" lead or project ground forward on "C" lead. Sending immediately, or check for stop-go or wink signal. Intertoll trunks using code 102 and 103 test terminations or other types of trunks using different test termination. Input impedance of 900 or 600 ohms.

Tests made on trunks: seizure, return of ground on "C" lead, stop-go or wink signal, condition of "C" lead during pulsing, whether stop-dial is encountered during pulsing, loop or leak pulse conditions on loop type trunks, supervisory test for slow or no supervision, and transmission loss test at 1000 cycles.

Trunks are routine in sequence, one at a time. Stops routing when last trunk circuit on a rack has been tested. Router normally by-passes busy trunk circuits. By key operation it will camp-on busy circuits until they become free or router is restarted by attendant. Optionally, by key operation it will camp-on a busy trunk for a timed interval, after which a printed record of the busy will be made and router will automatically restart. A printed record is made of busy reference trunks when conducting a transmission test.

A printed record is made of all trunks with trouble and router is automatically advanced to next trunk. By key operation, it will stop on all trunk faults with a choice of whether to print a record or not. Repeat testing continuously on a particular trunk circuit by key operation. Single repeat testing feature (for recycling a particular test on a particular trunk while observing its operation at trunk bay) by key operation.

Provides pulsing test conditions (NONE, LEAD A and B at 59% break and LOOPS of zero, 1000 ohms and 1200 ohms at 68% break) by key operation to loop type trunks. Provides a seizure test on loop type trunks where current to trunk circuit "A" relay is limited to 16.5 ma. @ 50 volts.

Normally makes both a supervisory and a transmission test on each trunk. By key operation, only a supervisory or a transmission test may be performed. Provides stable, preliminary amplification of 1000 cycles for automatically measuring trunk transmission losses. Provides level detection to indicate when an incoming signal is at or above a certain reference level. Capable of detecting transmission losses on trunks up to 25 db in 1 db steps. Capable of either one-way or loop-around transmission loss test.

Provides for out-pulsing a maximum of fifty different ten digit numbers for trunk testing on either a loop, simplex, or multifrequency basis or any combination thereof. Provides synchronous motor as a pulsing source. Provides progress lamps for supervision of the router. Provides talk and monitoring circuit for individual trunk testing. An alarm is sounded on all faults although the router does not stop. Provides preset circuit to select the group, rotary access switch, and rotary access switch position from which office routing is to start.

Can be arranged to dial any of the following test lines:

- a. For intertoll trunks code 103 is pulsed to reach supervisory test line and code 102 to reach transmission test line to check for transmission loss.
- b. Preferred supervisory test line for other than intertoll trunks provides special supervisory signals with tone ("Non-synchronous" type test line termination).
- c. Preferred transmission test line for other than intertoll trunks provides 1-milliwatt 1000-cycle tone for checking one-way transmission loss.
- d. Preferred loop-around transmission test line provides access to two connector terminals for loop-around trans-

mission loss tests.

e. If test line per "b" is not available, one with special supervisory signals without tone may be used. Usually test line for supervisory test (often called "Synchronous Test Line") is used in crossbar or panel offices.

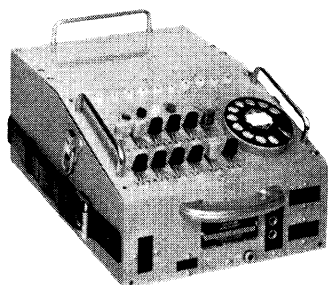
f. If test line per "b" or "e" is not available, a subscriber's line that is marked busy may be used for supervisory test line.

g. When the only supervisory test line available provides flash supervision (without tone) only, it may be used for supervisory tests.

The equipment which comprises the Automatic Trunk Router is mounted on relay racks which measure 28 $\frac{3}{8}$  inches wide and 132 inches high. The Automatic Trunk Router is engineered to specific requirements. Call us for assistance in preparing your specifications.

REFERENCE: Technical Bulletin 211-457.

**Type 59 Ticker Test Sets**



The Type 59 Ticker Test Set is a portable unit designed to test Type 59 Tickers in small offices not equipped with monitor panels.

The test set can also be used to supplement a monitor panel in a small office by providing additional tests possible only with complete monitor panels found in large offices.

The test set contains four keys to simulate seizing the Ticker under four different conditions as follows:

LOCAL KEY simulates seizure of the Ticker from a local selector for type "B" service.

REMOTE B KEY simulates seizure of the Ticker from an incoming unit via a Ticker hunter for type "B" service.

INC. D KEY simulates seizure of the Ticker from a Ticker selector for type "D" service.

NO. "O" K KEY simulates seizure of the Ticker from an incoming selector or rotary switch for type "D" service.

The test set control panel contains a dial which can be used to dial into the Ticker as from an individual line. The dial when used in conjunction with the TIP/SPOTTER key simulates dialing from a party line by providing identity marks.

Digit sending keys, in code form are provided to simulate keying in digits from the operator's position.

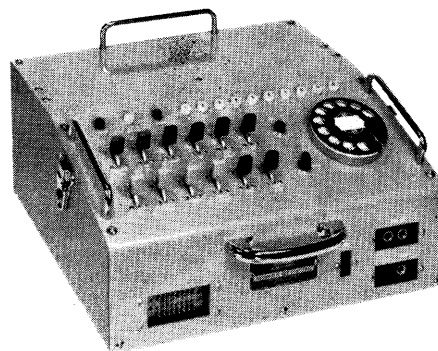
Digit display lamps are provided which display the digits keyed into the Ticker.

The test set is housed in a gray metal case equipped with a detachable cover and a metal carrying handle.

Dimensions: width, 10 $\frac{13}{16}$  inches; height, 8 $\frac{1}{2}$  inches; depth, 12 $\frac{13}{16}$  inches.

Order No.	Description	Price Each
<b>H-883413-1</b>	Type 59 Ticker Test Set.....	<b>\$425.00</b>

**Type 62 Ticker Test Sets**



The Type 62 Ticker Test Set is a portable unit designed to test Type 62 Tickers in small offices not equipped with monitor panels. The test set can also be used to supplement a monitor panel in a small office by providing additional tests possible only with complete monitor panels found in large offices.

The test set contains five keys to simulate Ticker seizure under various conditions as follows:

LOCAL KEY simulates seizure of the Ticker from a local selector for type ANI service.

REMOTE ANI KEY simulates seizure of the Ticker from an incoming unit via a Ticker hunter for type ANI service.

INC. CKO KEY simulates seizure of the Ticker from a Ticker selector for type CKO service.

NO. "O" CKO KEY simulates seizure of the Ticker from an incoming rotary switch or selector for type CKO service.

When PPCS access to the Ticker is desired, key PPCS is operated in addition to one of the above keys.

The test set control panel contains a dial which can be used to dial into the Ticker as from an individual line. The dial when used with the TIP RING/SPOTTER key simulates dialing from a party line by providing identity marks.

Digit sending keys, in code form are provided to simulate keying in digits from the operator's position.

Digit display lamps are provided which display the digits keyed into the Ticker.

The test sets functional equipment is housed in a sturdy metal case provided with a lock-on cover and a carrying handle. The test set measures 7 $\frac{3}{4}$  inches high, 14 $\frac{3}{16}$  inches wide, and 12 $\frac{3}{16}$  inches deep.

Order No.	Description	Price Each
<b>H-884582-1</b>	Type 62 Ticker Test Set.....	<b>\$435.00</b>

**Type 62 Position Test Sets**

The Type 62 Position Test Set is a portable unit which provides a means of testing the operator's position circuit without the use of an operator's desk or a Ticker.

Features: simulates an operator's desk and a Ticker; tests the overlap feature to a CKO call; the digit keyed (CKO) or outpulsed is displayed on lamps on a code basis; digit sequence is supervised by ten lamps to indicate which digit is to be keyed or outpulsed.

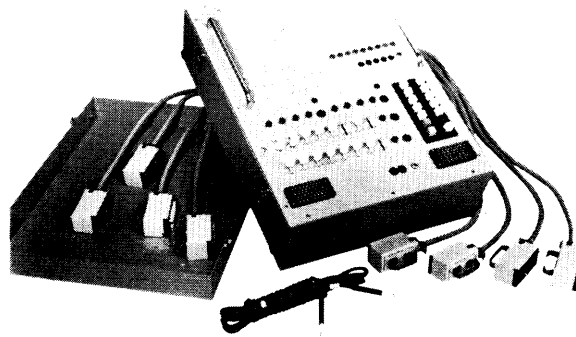
Tests may be made whereby the operator: starts timing; cancels timing; releases the toll line; keys in a new number; controls position disconnect; controls forced release.

The simulated Ticker can be arranged by key control to indicate a PPCS, CKO, PPCS-CKO, PPCS Detection Failure Call, PPCS Hotel Call, or PPCS Detail Billing Call.

Housed in metal case with lock-on cover and handle. Measures 7 $\frac{7}{8}$  in. high, 20 $\frac{13}{16}$  in. wide, and 16 $\frac{9}{16}$  in. deep.

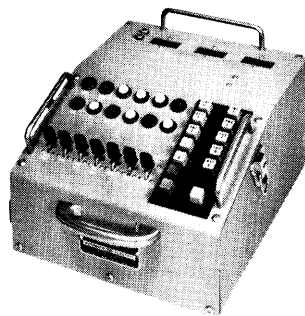
Order No.	Description	Price Each
<b>H-884596-1</b>	Type 62 Position Test Set.....	<b>\$975.00</b>

REFERENCE: Technical Bulletin 108-720.





## SATT CKO Operators' Position Test Sets



The CKO Operator's Position Test Set for SATT systems is a portable unit designed to test the checking operator's position circuit for normal functioning. The unit is contained in a rectangular metal box with a detachable cover which is secured by snap-latches; a handle facilitates carrying of the test set. The test panel contains a key-set (0-9 or 1-0), test keys and indicator lamps which are

protected by guard bars; an operator's headset jack is also included. Three 10-conductor cords are connected between the test set and operator's position circuit receptacles for testing purposes. All tests of the operator's position circuit are initiated by the test set lever keys and monitored by the test set indicator lamps and jacked in headset.

This test unit provides for a series of tests on the CKO operator's position circuit, these tests verify normal operation of: the position distributor and position circuit; the accept key; line seizure; "Zip" tone circuit; class-of-service tone circuit; manual check circuit for class-of-service tone; supervisory circuits and supervisory lamps; start key; error key; supervisory circuit detecting keying errors; disconnect key; automatic disconnect circuit; toll board; toll position adapter control lead; guard features between tollboard and CKO position.

Dimensions: height,  $8\frac{1}{8}$  inches; width,  $10\frac{3}{16}$  inches; depth,  $13\frac{13}{16}$  inches. Weight, 10 pounds.

Order No.	Description	Price Each
<b>H-883274-1</b>	SATT CKO Operator's Position Test Set (0-9 Keyset) .....	<b>\$365.00</b>
<b>H-883274-2</b>	SATT CKO Operator's Position Test Set (1-0 Keyset) .....	<b>365.00</b>

## Type 59 SATT Monitor Panels

The Type 59 Monitor Panel is designed to test nearly all the Type 59 SATT equipment in the toll center office plus equipment in the tributary and branch offices.

The monitor panel indicates progress and equipment status of the SATT equipment in operation. It can also be used to detect irregular or faulty equipment functioning.

Through the operation of various keys the operator can perform the following: Access and test each Ticketer with any desirable transender. Access and test each transender with any desirable Ticketer. Access and test each trunk of a sub office trunk group to the main office with any Ticketer and transender. Simulate dialing from "O" party and 1-10 party stations and from two party and four party lines. Accelerate test time pulses from 60 ipm to 600 ipm.

The monitor panel also provides the following features: An impulse speed and percent make circuit for checking the test dials and pulses from the transender. Various line conditions such as direct or 200 ohm station ground, ground leak accept and reject limits, no detection condition, and 12,000 ohm shunt and 1200 and 0 ohm loop pulsing limits. Simulates answer, flash busy, or stop-dial supervision. A digit display circuit for the following: the routing directive and the dialed number for the Ticketer test; display of information sent from the transender; display circuit for testing conversation timing in the Ticketer. Detector alarm supervision.

The equipment comprising the Type 59 Monitor Panel can be mounted on a 9' or 11'8" high rack.

Engineered per individual requirements.

## Type 62 SATT Monitor Panels

The Type 62 Monitor Panel is designed to facilitate monitoring, routing, and testing Type 62 SATT installations. The monitor panel is located in the main office with facilities for testing the SATT equipment in tributary office.

The Type 62 Monitor Panel can access a maximum of 100 Ticketers. Additional monitor panels can be provided for each group of 100 Ticketers.

The Type 62 Monitor Panel incorporates equipment to provide the following features: Access circuits for transenders, tabulators and tributary office trunks. Type of call such as ANI, CKO, SS, or PPCS can be simulated through key operation. An impulse speed and percent make circuit for checking test dials and pulses from transenders. Simulate dialing from two and four party lines, where party #1 provides no identity mark, party #2 provides 3000 ohm resistance ground tip mark, party #3 and #4 use a spotter mark. Optional arrangement simulates dialing from individual lines and 1 to 10 party stations. One ten lobe SATT dial is used for marking parties 1 to 10 for detection tests. A digit display of the routing directive and the dialed number for the Ticketer test, a display of all information sent from the transender and also a display for testing conversation timing. Simulates answer supervision, and flash busy and stop-dial supervision. Simulates following line conditions: direct or 200 ohm station ground; lead accept and reject limits; no detection condition; and a 12,000 ohm shunt or 0 and 1200 ohm loop pulsing limits.

The equipment comprising the Type 62 Monitor Panel can be mounted on a 9' or 11'8" high frame.

Engineered per individual requirements.

## Party Identity Testing Circuits

## For 4-Party Type 62 SATT without Spotter Battery

The Party Identity Testing Circuit for 4-Party Type 62 SATT without Spotter Battery is used to detect party identity where the converted Type 59, and Type 62 SATT 4-party identification scheme is provided. This circuit is used in conjunction with Dial Speed Testing Circuit, H-85175, or equivalent. The Party Identity Testing Circuit can be accessed from a selector level through the Dial Speed Testing Circuit. All signals to the test man are by tones.

In addition to the points mentioned above, the following features are provided:

Digit counting to verify the digit dialed when checking party identity. Detects ground faults of sufficiently low resistance on the "tip" side of the line.

Provides tones to permit test man to monitor the results of a test.

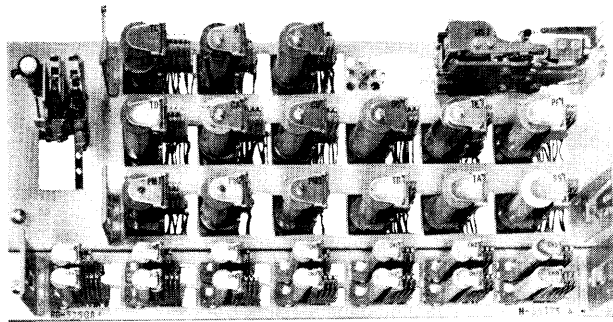
Provides test jacks and busy key.

The equipment of the Party Identity Testing Circuit is rack mounted.

Order No.	Description	Price Each
<b>DH-85901-B70A</b>	Party Identity Testing Circuit for 4-Party Type 62 SATT without Spotter Battery .....	<b>\$225.00</b>



# Dial Speed and Party Identity Test Circuits



The Dial Speed and Party Identity test circuits are rack mounted units, located in a central office, used to test dial speed of subscriber dials and making party identification tests on SATT dials.

The Dial Speed Test Circuit used alone permits testing dial pulse speed from the subscriber's station. This circuit is accessed via a selector level and is seized by dialing a subscriber type number. The Dial Speed Test Circuit when used in conjunction with various Party Identity Test Circuits is capable of checking both dial pulse speed and party identification tests on SATT dials from the subscriber's station.

The following features are available: Dial speed test circuit to work with rotary or vibrator type tone and ringing equipment. 5-party identity tests on Type A SATT dials when SATT equipment uses Call Recorder circuit H-85199. 10-party identity tests on Type B SATT dials. 4-party identity tests on dials in a Type 59 or Type 62 SATT System. Mixed 4 and 10-party identity tests on dials on a Type 59 or Type 62 SATT System.

The functional equipment of the Dial Speed Test Circuit and Party Identity Circuits mounts on steel bases which measure 18 $\frac{3}{4}$  inches wide and 8 $\frac{1}{2}$  inches high.

## Dial Speed Test Circuits

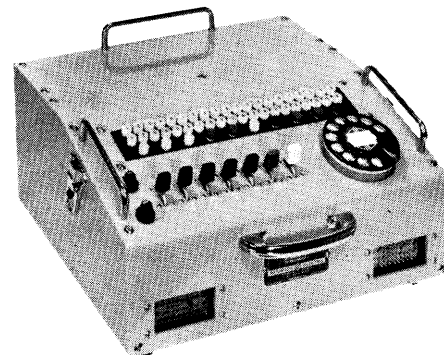
Order No.	Description	Price Each
<b>DH-85175-73A</b>	Used when rotary type tone and ringing equipment are used . .	<b>\$300.00</b>

## Party Identity Test Circuits

Used in Conjunction with the Dial Speed Test Circuit

<b>RG-5348-A</b>	Used for 5-party identity tests on Type A SATT dials when SATT equipment uses call recorder circuit H-85199. . . . .	<b>\$250.00</b>
<b>RG-5169-A</b>	Used for 5-party identity tests on Type A SATT dials when SATT equipment uses controller circuit H-85301 and coder circuit H-85303. . . . .	<b>275.00</b>
<b>DH-85401-71A</b>	Used for 10-party identity tests on Type B SATT dials. . . . .	<b>275.00</b>
<b>DH-85901-71A</b>	Used for 4-party identity tests on dials on a Type 59 or Type 62 SATT System. . . . .	<b>285.00</b>
<b>DH-85901-A70A</b>	Used for mixed 4 and 10-party identity tests on dials in a Type 59 or Type 62 SATT System. . . . .	<b>285.00</b>

# SATT System Type B Terminal Detection Test Sets



The SATT System Type B Terminal Detection Test Set is a portable unit designed for use in centralized Type B or 59 SATT networks for testing of detectors. This unit simulates Ticketer operation to the detector and detector assigner.

The test unit provides means for testing terminals for correct detections or testing detector operations by dialing either a special test number or a station number and observing the resulting detection displayed on the digit lamp panel. The dialing operation causes a special test distributor and selected test connector to seize the dialed line equipment. After the test number is dialed the detector assigner causes the test equipment to be connected to the detector. The detector forwards the resulting detection information to the test equipment where this information and the dialed number is registered and displayed on the digit lamp panel.

The following features are provided for in this test unit.

The common test equipment provides an individual test distribution key and requires a separate test distributor for each group of 10,000 terminals.

Provides lamp display of detected number of CN lead accessed for test via special test distributor and regular test connector. Test is made on CN lead for crossed condition (excessive battery) and idle condition (normal resistance battery) before detection attempt. Party O (individual) or parties 1-10 will be indicated to the detector by pre-setting party keys. Detection repeat and test connector release keys are provided. Test connector may be stepped across level by dialing series of "ones."

Access is provided to one of two test distributors by key selection.

Provides universal self switching.

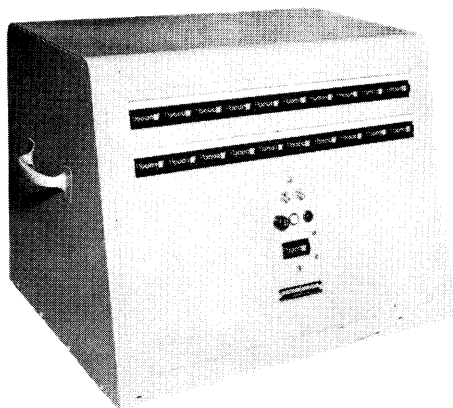
The test set's functional equipment is housed in a sturdy metal case provided with a lock-on cover and a carrying handle.

Dimensions: width, 14 $\frac{3}{16}$  inches; height, 8 $\frac{1}{2}$  inches; depth, 13 $\frac{15}{16}$  inches.

Order No.	Description	Price Each
<b>H-882610-1</b>	SATT System Type B Terminal Detection Test Set . . . . .	<b>\$775.00</b>

Prices are subject to change without notice.

## Trafficorders



The Automatic Electric Trafficorder is a portable, self-contained and fully automatic device for measuring traffic loads and indicating the utilization of switching equipment in automatic exchanges.

Two models are available, one for scanning 10 lines, the other scanning 500 lines. These units scan all lines every 10 and 100 seconds and count the number of busy switches in the group. From this data, and standard traffic tables, grades of service can be determined and any required redistribution of traffic load among the switch groups can be arranged for their most efficient utilization. Both units operate from the regular 48-volt exchange battery—the 500-line by means of a lead cord with plugs and the 10-line by two cords, one with alligator and one with plugs. A power cord and plug is provided for the 115-volt a.c. supply on the 10-line unit; an a.c. cord and a 48-volt d.c. cord are provided for 500-line models.

**The 10-Line Trafficorder** is contained in a grey baked enamel aluminum case measuring  $14\frac{3}{16}$  inches wide,  $12\frac{3}{16}$  inches deep and  $7\frac{3}{4}$  inches high.

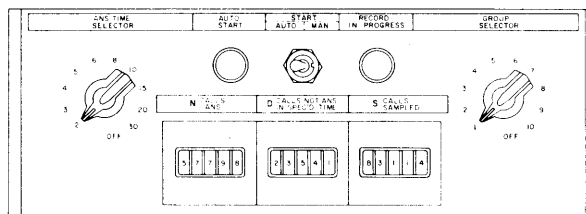
**The 500-Line Trafficorder** measures  $21\frac{1}{2}$  inches wide,  $16\frac{1}{2}$  inches deep and  $15\frac{7}{8}$  inches high. Either plug connections or screw-type terminals are available.

Order No	Description	Price Each
<b>H-882580-1</b>	500-Line Trafficorder with plug type terminals.....	<b>\$1325.00</b>
<b>H-882581-1</b>	Terminal Unit for 500-Line Trafficorder.....	<b>275.00</b>
<b>H-881349-1</b>	500-Line Trafficorder with screw type terminals.....	<b>1750.00</b>
<b>H-883570-1</b>	Rack-Mounted Terminal with plug type connectors.....	<b>75.00</b>
<b>H-882596-1</b>	25-Conductor Patch Cord Assembly.....	<b>15.00</b>
<b>H-884401-1</b>	10-Line Trafficorder.....	<b>450.00</b>
<b>D-543333-A</b>	Battery Cord with 48-volt, d.c. battery supply junction.....	<b>3.55</b>
<b>D-543175-C</b>	Battery Cord with alligator clips...	<b>3.20</b>
<b>D-543176-A</b>	Power Cord.....	<b>5.70</b>
<b>D-543305-A</b>	"C" Lead Cord.....	<b>.76</b>

REFERENCE: Technical Bulletin 209-705 for 10-line unit; Technical Bulletin 209-349 for 500-line unit.

## Answering Time Recorders

## With Weighting Facility



The Answering Time Recorder is an electromechanical device to measure how many incoming calls are not answered in a specified time period.

The equipment is arranged to allow connection of 10 groups of 25 lines or trunks and allows selection of one group on which measurements are to be taken. Incoming calls can be measured against a preset time, ranging from 2 to 30 seconds, by the operation of a selector switch. Calls not answered within this time are tallied on a counter. Other counters show the total number of calls answered and the total number of calls sampled.

The Answering Time Recorder consists of a control panel and an answering time recorder equipment assembly. The ATR control panel mounts in the jack field of AE toll boards and is positioned by jack fasteners in the same manner as regular jack equipment. A traffic weighting applique circuit is available to convert circuit H-83153 to three meter service.

The control panel contains all of the controls and indicators associated with the ATR.

Order No.	Description	Price Each
<b>H-884130</b>	Answering Time Recorder Control Panel (mounts in jack panel), $11\frac{1}{8} \times 4$ inches.....	..*
<b>H-884630-1</b>	Answering Time Recorder Control Panel, rack mounted, $1'5\frac{3}{4} \times 2\frac{1}{8}$ ".....	<b>\$100.00</b>
<b>DH-83204-70A</b>	Time Recorder Equipment Assembly, $18\frac{3}{4}$ inches wide (for 19-inch rack).....	<b>1168.67</b>
<b>DH-83204-71A</b>	Time Recorder Equipment Assembly, $23\frac{1}{4}$ inches wide (for 23-inch rack).....	<b>1206.97</b>
<b>DH-83205-70A</b>	Traffic Weighting Applique Circuit, 3-meter service converter, $1'5\frac{3}{4} \times 2\frac{1}{8}$ ".....	<b>418.60</b>
<b>DH-83205-71A</b>	Traffic Weighting Applique Circuit, 3-meter service converter, $1'10\frac{5}{8} \times 11\frac{3}{32}$ ".....	<b>413.68</b>

\*Prices will be furnished on request.

REFERENCE: Technical Bulletin 209-550.

## Type 80143 Alston Electronic Traffic Scanners

### Portable

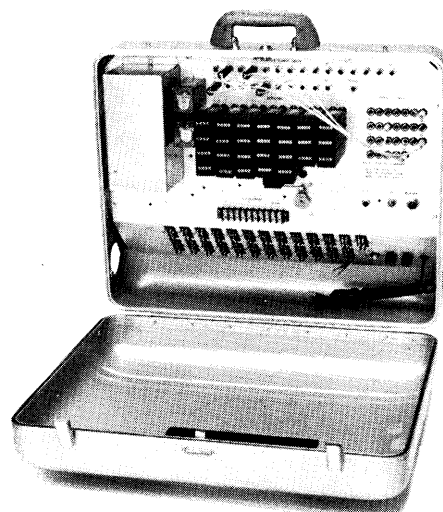
The Type 80143 Portable Traffic Scanner is equipped with twenty-five 10-pin Jones connectors which may be patched into circuits to be tested with extension cables.

A two-conductor 20-foot battery and ground cable is furnished for connection to the exchange battery. It contains a one-minute timer for controlling the start of a scanning cycle, provisions for 26 plug-in type registers, and a cross-connect field for patching the output from the scanner section into 1 to 25 registers. The 26th register is used to indicate the number of times the unit has scanned the trunks being tested.

The unit may be made to operate once each minute, or to operate continuously at approximately  $2\frac{1}{2}$  scans per minute.

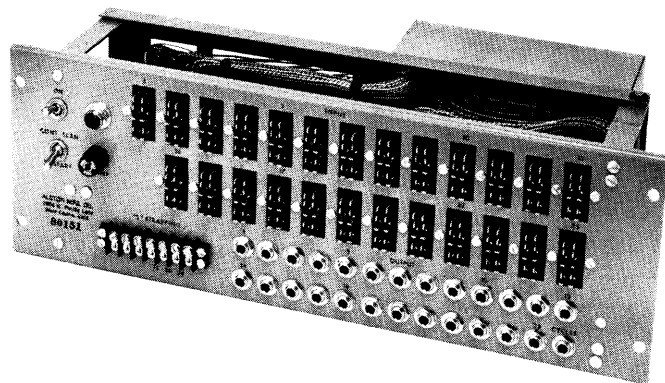
The portable scanner is housed in an aluminum case measuring 17x21x7½ inches.

Type	Description	Price Each
<b>80143</b>	Portable Electronic Traffic Scanner.....	<b>\$460.00</b>



## Type 80151 Alston Electronic Traffic Scanners

### Permanently Mounted



The Type 80151 Electronic Scanner is a compact unit designed for 19-inch relay rack mounting. It has a capacity of scanning 250 trunks arranged in 25 groups of 10 trunks each. The 25 Jones plugs enable "patching" into a "C" lead appearance panel (receptacle strip) via patch cords.

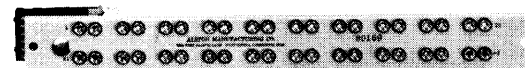
The unit may be set for continuous scanning or for timed scanning at either 60 or 100 sec. intervals. The timer to be furnished depends on interval desired. The timer is a separate rack-mounted unit which can accommodate up to 100 scanners.

The 25 telephone-type output jacks on face of scanner unit are connected into a chain so that the output from any number of input plugs (10 conductors each) may be read on a single plug-in type register. The 26th jack on the unit is the output for "cycles"—connected to a meter, this registers the number of times unit has scanned.

Screw terminals on face of scanner are a facility which enables user to "S" strap the unit to increase frequency of



Scanner Timing Panel



Scanner Output Patch Panel



Traffic Register Panel

scans per minute. ("S" strapping options should be selected only when scanner is used for continuous scanning.) The power requirements of scanner and timer are 48 volts d.c. Dimensions: 18¾ in. wide; 6½ in. high for AE Co.-type rack mounting. Telephone gray baked enamel finish.

Scanner is connected to its components as follows: "C" leads of switches to be recorded are terminated on receptacle strips (also called patch panels). Patch cords are inserted into receptacles on strip, appropriate ends of patch cords are plugged into 10-conductor plugs on scanner.

Output patch cords, used to plug into output jacks of scanner, connect scanner "output" to an output patch panel. Patch panel is connected to a register panel which accommodates plug-in type meters. The connection between the output patch panel and the register panel can be jumper wire if registers are located in same rack (cable if not in same rack). Register panel can accommodate up to 20 registers (ELMEG AZ4 or equal).

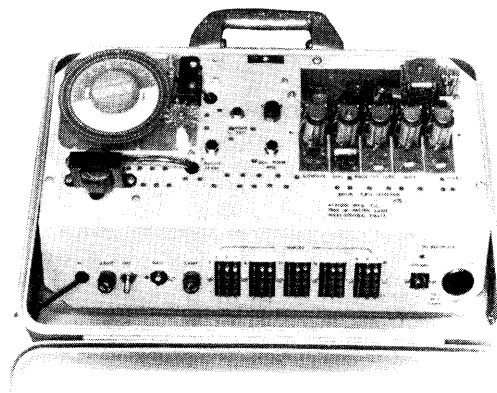
Order No.	Description	Price Each
<b>714959</b>	Type 80151 Electronic Traffic Scanner with 26 patch cords approx. 8 feet long.....	<b>\$385.25</b>
<b>713980</b>	Scanner Timing Panel (60-second intervals).....	<b>28.75</b>
<b>713981</b>	Scanner Timing Panel (100-second intervals).....	<b>28.75</b>
<b>713963</b>	Scanner Output Patch Panel.....	<b>13.23</b>
<b>714401</b>	Traffic Register Panel (capacity 20 registers).....	<b>13.23</b>
<b>793580</b>	Four-Digit, Plug-In Register Meter for traffic register panel (ELMEG AZ4).....	<b>8.40</b>
<b>791770</b>	20-Ft. Patch Cord, 10 conductors; connects receptacle strip and scanner.....	<b>3.74</b>
<b>H-884629-1</b>	50 10-Pin Receptacle Patch Panel ("C" leads).....	<b>90.00</b>
<b>H-885746-1</b>	15 10-Pin Receptacle Patch Panel ("C" leads).....	<b>14.38</b>

Prices are subject to change without notice.

R-27

## Alston Portable Service Observing Equipment

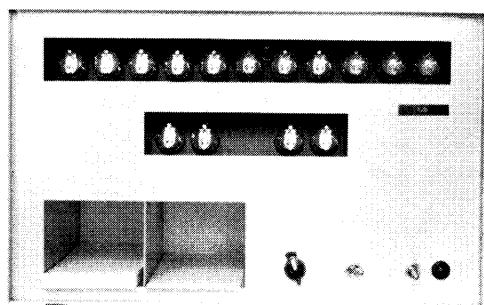
## Tape Type



Call Selector



Uher Tape Recorder



Data Display Turret

This system provides for service observing on an unattended basis through the use of magnetic recordings.

It consists of three major components: a 25-Trunk Call Selector, a Uher Tape Recorder, and a Data Display Turret.

The call selector is a portable unit used in conjunction with the tape recorder in switchrooms requiring service observing. The tape recordings go to the data display turret for a readout. The data display turret is also used with a tape recorder. The recorder plays back recordings made in switchrooms and the data display turret displays the number dialed and provides an interval timing display.

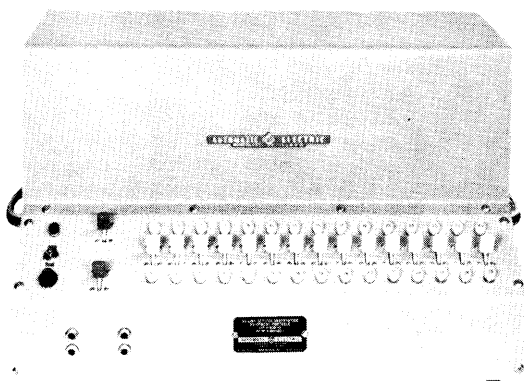
**The call selector** provides for service observing on up to 25 SATT or non-SATT trunks. It features a 24-hour program clock for service observing scheduling, trunk allotter for allotting 25 trunks to the recorder, transistorized voice amplifier circuit that controls conversation level applied to the tape recorder, transistor circuitry that senses the dial impulses, corrects the impulses to uniform lengths and magnitudes, and converts the pulses to bursts of 2000-cycle tone for application to the tape recorder, and a timing circuitry to provide 10-second conversation timing and 50-second time-out on a busy or unanswered line.

**The data display turret** permits reading of the tape recorded service observing data by an operator. It is used with the Uher tape recorder. The data display turret has a lamp display to show the called number, an electronic 100-second stop clock for timing, an IBM ticket storage compartment, two foot controls—one for the tape recorder and one to cancel the lamp display and control the timer.

**The portable Uher tape recorder** weighs 20 pounds. It uses half-track tape and provides 12 hours running time per reel. With the data display turret, the recorder is controlled by the foot control which permits the observer to start or stop the tape and to rewind.

Description	Price Each
Portable Service Observing Equipment—Tape Type:	
Call Selector.....	\$626.75
Data Display Turret with Clock.....	1207.50
Data Display Turret less Clock.....	885.50
Uher Tape Recorder with Aluminum Case.....	299.00
Uher Tape Recorder with Foot Switch, less Case.....	281.75
Call Selector Test Set.....	46.00

### Service Observation Equipment



The portable Service Observation Equipment provides monitoring facilities on a total of 30 SATT and non-SATT dial lines, common battery lines, or trunks. No provisions are made for observing magneto lines. The equipment may be used in any office having 48 volts d.c. available.

Key selection of lines is on a priority basis. If a call originates on a line of higher priority during a particular observation, the attendant can immediately transfer to the higher priority line by operating the proper key.

The collected data provides useful information on performance of equipment, service requirements, customer mis-dialing, and other grades of service indications.

It comes with 12 cords—6 with alligator at one end, Cinch Jones connector on the other and 6 with Cinch Jones on both ends, male and female.

The control cabinet unit is housed in a gray, pebbled enamel cabinet. Switches, keys, and indicator lamps are on the sloping control panel. Furnished with carrying handles.

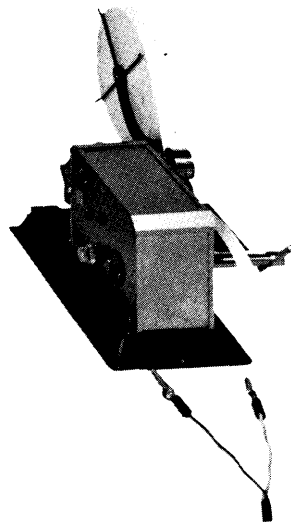
Cabinet dimensions are 20 inches wide, 11 $\frac{15}{16}$  inches high, and 11 $\frac{3}{4}$  inches deep.

Weight, 40 pounds.

Order No.	Description	Price Each
<b>H-885003-1</b>	Service Observation Equipment....	<b>\$1500.00</b>

REFERENCE: Technical Bulletin 209-719.

### Accessories for Above



Pen Register

#### Pen Registers

For visual indication of dial pulsing on lines under observation.

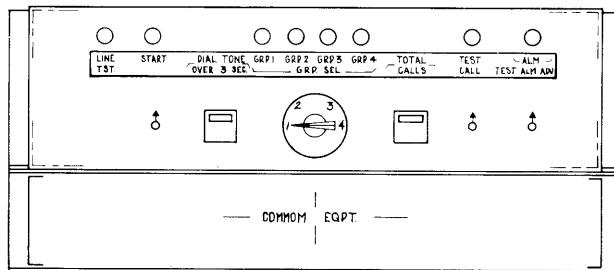
Order No.	Description	Price Each
<b>D-70124A</b>	Pen Register....	<b>\$201.48</b>

#### Patch Panels

Eliminates pre-selecting lines to be checked.

Order No.	Description	Price Each
<b>H-885746-2</b>	Patch Panel.	<b>\$18.17</b>

### Dial Tone Delay Recorders (Non-Director Offices)



The Dial Tone Delay Recorder measures the per cent of test calls on which dial tone is delayed beyond the standard interval of three seconds. Linefinder groups can then be loaded in excess of figures indicated by standard engineering tables for more efficient equipment usage.

The Recorder is arranged to have a maximum of four rotary access switches with 50 access points on each switch. A fully equipped recorder has access to 200 lines, and a maximum of 200 finder groups can be timed.

Linefinder test lines and/or vacant subscriber line circuits can be used by the recorder.

Since the Recorder is not looking for actual dial tone, but rather the ground that accompanies the tone, the test lines and line circuits require a minor wiring change.

The Dial Tone Delay Recorder seizes the line relay of the test line, or a vacant subscriber's line equipment, through the banks of the rotary access switches. The Recorder then meters the time it takes a linefinder to find the line equipment calling for service and switch it through to a first selector. Ground returned along with dial tone will give a peg count indicating one of the following conditions: tone received in 1 second; tone received in 2 seconds; tone received in 3 seconds; tone not received in 3 seconds; and total calls attempted.

Peg count can also be furnished on a finder-group basis, to denote total calls received by the group from the Recorder and number of calls in the group that did not receive dial tone within three seconds.

The Dial Tone Delay Recorder cycles at a set rate of 900 calls per hour. The office IPM is used for the timing source. If dial-tone ground is not returned within 3 seconds, a meter registers once and the recorder begins to test the next line. The recorder can be manually set for continuous testing or it can be set to "lock in" if a ground is not received via the first selector upon switchthrough. In the "lock in" condition, a two minute delayed alarm is provided.

The Dial Tone Delay Recorder mounts on 19-inch rack. The four access switches are mounted on a separate mounting base.

Order No.	Description	Price Each
<b>H-886001-1</b>	Dial Tone Delay Recorder—Common Equipment.....	<b>\$260.00</b>
<b>H-886009-1</b>	Rotary Access Switch Unit equipped with one Type 45 rotary switch, terminal block, mounting plate, unit cable, relay and associated mounting material. ....	<b>135.00</b>
<b>H-886009-2</b>	Rotary Access Switch Unit equipped with two Type 45 rotary switches, terminal blocks, mounting plate, unit cables, relays and associated mounting material. ....	<b>260.00</b>

Prices are subject to change without notice.

## McAllister Automatic Dialing Routers and Grade of Service Recorders

This instrument is designed to test any type of d.c. pulsed central office equipment (step-by-step, all-relay, crossbar) for its ability to successfully reach the desired number. It is connected to any idle line or test line.

The unit can be attached to any line number selected as the calling number and will dial any other line number selected as the called number. Any amount of digits from 1 to 10 can be dialed and one digit at a time can be dialed. It will dial and redial the selected called number if no failure in the dial equipment is encountered. If a failure occurs, dialing will stop and an alarm sounded.

It will test the ringing, answering and reverse battery features of the connector switch in the dial equipment switching train. It will release and redial the selected called number upon receipt of a.c. ringing current only from the connector switch and only when both a.c. ringing current and reverse battery is furnished from the connector switch. It can be operated manually at any time. The speed and percent make of the created pulses are adjustable and can be measured. It will register the number of calls originated and correctly com-

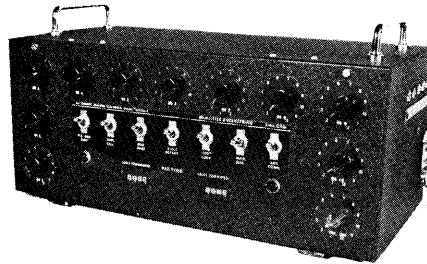
pleted. It will not start dialing until the dial equipment is ready to receive pulses. An attendant, after placing the Router in operation, is no longer required until a fault in the dial equipment is encountered.

The unit not only locates equipment failures but indicates the type of failure to look for and where to look for it.

When the unit does encounter an equipment failure, it stops dialing and holds all the equipment involved in the failure right up to the point where the failure occurred.

Being portable and weighing only 25 pounds, it can be transported to and used to test any dial equipment, regardless of its location—unattended exchanges, PABX equipment, etc. It is easy to install and operate.

Also available is a permanently mounted and wired version of the above model. It has all the features of the portable unit, except portability, plus automatic selection of a group of calling line and called line test numbers. It consists of the dialing router and automatic calling line selector, the automatic called line selector, and the manual called line selector.

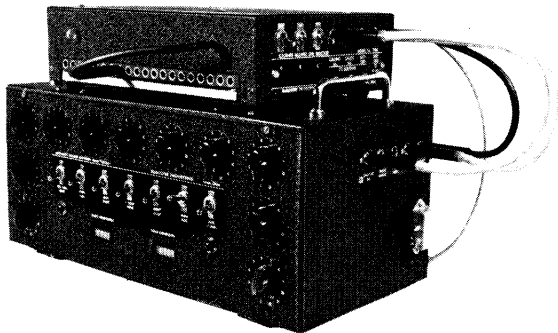


Portable Unit

Description	Price Each
Automatic Dialing Router and Grade of Service Recorder—Portable .....	<b>\$690.00</b>
Automatic Dialing Router and Grade of Service Recorder—Permanently Mounted ..	...*

\*Price will be furnished on request.

## Router Multiple Calling Line Selectors



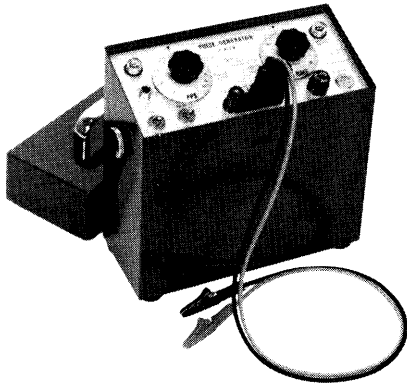
Router Multiple Calling Line Selector with Portable Automatic Dialing Router and Grade of Service Recorder

The Router Multiple Calling Line Selector was designed to be used with the portable Automatic Dialing Router and Grade of Service Recorder test unit listed above.

Any group of test line numbers may be attached to this unit thus allowing the router to progressively make calls from the same test line number or from different test line numbers. Any test line number attached to the unit may be selected at will, manually.

Description	Price Each
Router Multiple Calling Line Selector .....	<b>\$300.00</b>

**Type P-672-B Proctor Pulse Generators**



A self-contained switching generator to test pulse operated equipment. Designed for rapid and accurate determination of switching system limitations, testing relays for speed versus ratio characteristics, testing telemetry circuits, calibration of toll and local testboard apparatus, shop reference for existing test equipment and general routine maintenance.

Used for switch routing with P-70 Switch Routing Adapter, testing E-M circuits with P-71 Universal Test Adapter, and determining distortion with P-652 Analyzer.

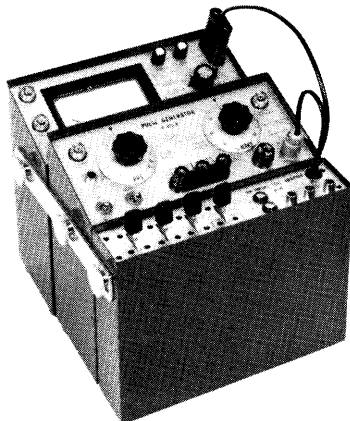
Generator is capable of switching resistive or reactive loads of 200 va. not to exceed 1 amp. or 200 volts. Pulse rate is adjustable from 5 to 20 pps.

Portable and self-powered; weighs 9¼ lbs. Powered by an internal 18-volt battery supply. A regulating circuit in generator maintains a constant voltage supply throughout normal battery life. Before battery voltage is reduced to a point where proper instrument accuracy cannot be maintained, pilot light is automatically turned off, generator is turned off, and replace battery lamp is activated. Also equipped with a jack permitting unit to be operated from a nominal 48-volt central office battery.

Generator is a solid state device driving a high speed mercury-wetted contact relay in the output having one non-bridging Form "C" contact arrangement. Designed as a primary pulsing source and/or to provide controlled pulses to other makes and types of test equipment.

Measures 8¼x8¼x3¾ in. Available rack mounted.

**Type P-71 Proctor Universal Test Adapters**



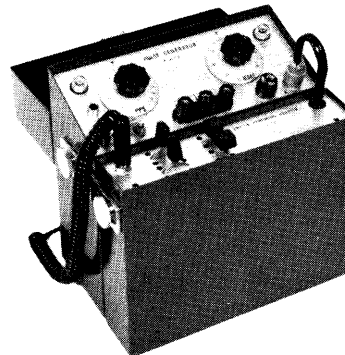
The P-71 Universal Test Adapter in association with the P-672-B Pulse Generator and P-652 Pulse Analyzer provides all the necessary switching combinations for testing E-M signaling circuits.

Simple plug-in connections facilitate testing procedures.

Measures 8¼x8x1¾ inches.

**Type P-71 Universal Test Adapter as used with P-672-B Generator and P-652 Analyzer**

**Type P-70 Proctor Switch Routing Adapters**



**Type P-70 Switch Routing Adapter as used with P-672-B Generator**

A "plug-in" control unit for the P-672-B Pulse Generator. Provides additional functions of controlled groups of pulses with simulated line conditions. Utilizing speed and ratio controls (pulse rate and width) of the P-672-B, this combination makes a versatile test equipment package.

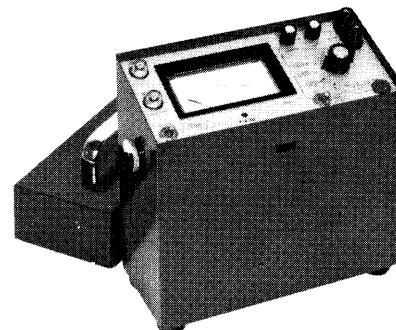
The P-672-B Generator with the P-70 Switch Routing Adapter permits simple testing of all existing type step switches

either in or out of normal shelf mounting. Extreme conditions of line, loop and leak can be simulated. The P-70 also tests other pulse-operated devices.

All operating controls are mounted on the top panel. Internal adjustments are provided to vary test conditions. Power to operate this transistorized unit is supplied by the associated P-672-B Pulse Generator.

Portable, compact and lightweight. Measures 8¼x8x1¾ inches.

**Type P-652 Proctor Pulse Distortion Analyzers**



Measures pulses from telephone dials, subscriber loops, switching trains, inter-office trunks and special facilities on a bridging basis.

Portable and self-powered; weighs 8½ lbs. including protective cover. Powered by an internal 18-volt battery supply. A regulating circuit in analyzer maintains a constant voltage supply throughout normal battery life. Before battery voltage is reduced to a point where proper instrument accuracy cannot be maintained, pilot light is automatically extinguished, analyzer turned off, and replace battery lamp is activated.

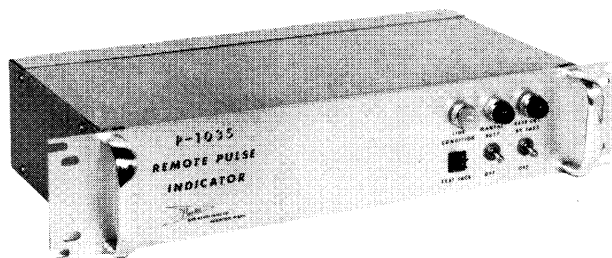
Analyzer is simple-to-operate, solid state device. Measures pulse width (ratio) of telephone dials at line cord, determines facility distortion, and gives rapid and accurate determination of accumulated switching system distortion. Allows bridged measurements across relay circuits, analyzes relays for speed versus ratio characteristics, analyzes telemetry circuits and the calibration of toll and local testboard apparatus. Used to determine circuit distortion with companion P-672-B Pulse Generator.

Measures 8¼x8¼x3¾ inches.

Type	Description	Price Each
<b>P-672-B</b>	Pulse Generator Only . . . . .	<b>\$385.00</b>
	Type P-70 Switch Routing Adapter Only . . . . .	<b>190.00</b>
	Type P-71 Universal Test Adapter Only . . . . .	<b>190.00</b>
<b>P-652</b>	Pulse Distortion Analyzer Only . . . . .	<b>350.00</b>

Prices are subject to change without notice.

## Type P-1035 Proctor Remote Pulse Indicators



The Type P-1035 Remote Pulse Indicator is a rack mounted pulse test set designed for selector access by subscriber or inter-office trunks. This solid state device permits both pulse rate (speed) and width (ratio) tests in a single operation replacing the mechanical dial speed test set.

It provides means for maintenance personnel to remotely test subscribers dials from customer premises. It permits testing of actual pulsing source (dial, relay, etc.) ignoring normal line loop condition.

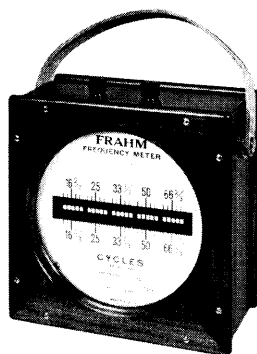
Type P-1035 is a precision instrument with factory-adjusted standard 9-11 pps., 36-41 per cent make. It is powered by a central office battery 44-54 volts, .320 amps.

Rack mounted, 3½-inch vertical rack space, 7½ inches deep, with standard 19-inch rack mount. Adapters also available for 23-inch mounting.

Operational manual included.

Type	Description	Price Each
<b>P-1035</b>	Remote Pulse Indicator.....	<b>\$450.00</b>

## Type F4 Frahm Portable Frequency Meters



This Type F4 Frahm Portable Frequency Meter is designed for use with portable test equipment.

It has 50 reeds in one row, 10 groups of reeds, 5 reeds per group in intervals of 1/3 cycle between reeds for following mid-center frequencies—16⅔, 20, 25, 30, 33⅓, 40, 42, 50, 60 and 66⅔ for operation on 90-150 volts.

It is self-contained in a polished walnut case with leather handle and rubber pads on bottom and back.

Overall measurements, 9¼x8½x4¾ inches.

Weight, 8 pounds.

Type	Description	Price Each
<b>F4</b>	Portable Frequency Meter .....	<b>\$192.50</b>

## Type MF-15 Frahm Miniature Portable Frequency Meters



The Type MF-15 Miniature Portable Frequency Meter is designed for use with portable test equipment.

Rated voltage is 100-150 volts. Operating voltage is 100-150 volts. Mid-scale frequency CPS 20, 30, 42, 54, 66.

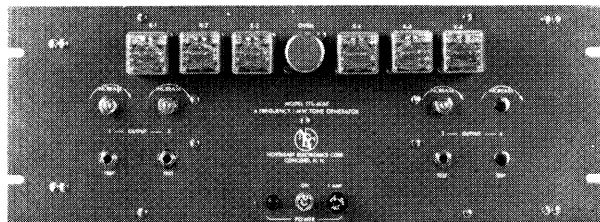
The case is metal (meter case plastic).

Overall measurements, 6x4x5 inches.

Type	Description	Price Each
<b>MF-15</b>	Miniature Portable Frequency Meter .....	<b>\$79.00</b>



**Type TTS-49AE Northeast Electronics  
6-Frequency, 1-Milliwatt Tone  
Generators**



Has four independent outputs, each via buffer amplifier, and six start leads which connect to AE Company Control Circuit H-83251-A. Each output from the tone generator may be used independently of the others, but only one frequency can be generated at a time. The Control Circuit H-83251-A controls the frequency generated by grounding the corresponding ST lead.

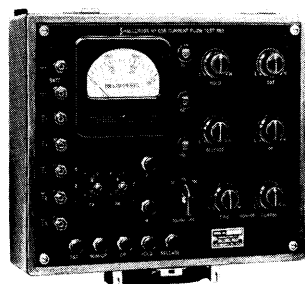
The tone generator (oscillator) should run continuously at some rest frequency such as 1000 cps.

The source impedance of each output is 900 ohms. Output level accuracy and long-term stability is  $\pm 1$  per cent. Harmonic distortion is less than 1 per cent.

The equipment occupies  $8\frac{3}{4}$  inches on a 19-inch relay rack. Recommended for use as needed in Class 5 offices.

Type	Description	Price Each
<b>TTS-49AE</b>	6-Frequency, 1-Milliwatt Tone Generator.....	<b>\$340.00</b>

**Shallcross Test Sets**



This completely self-contained Current Flow Test Set has five separate circuits. These can be used to apply successively the correct "Saturate," "Operate," "Non-operate," "Hold," and "Release" current to relays. Four of the circuits are identical but the fifth is adjustable over a wider range for "Non-operate" currents. Each circuit is identified and can be readjusted readily without disturbing the other circuits. Metered current is applied to the relay by depressing one of the corresponding switches.

The value of the current is indicated on a meter which has three separately fused ranges of 30, 150, and 750 ma full scale. The desired range is selected by a rotary switch. A full scale accuracy of  $\pm 2$  per cent is maintained.

By setting the variable resistance in one of the five circuits to 0 the No. 696 Test Set can be used as a milliammeter.

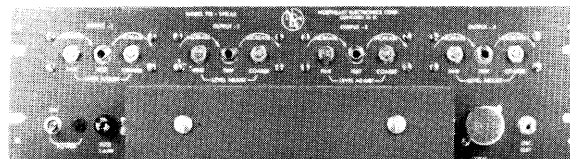
Powered by either a central office battery or an external battery of 22 $\frac{1}{2}$  to 45 volts.

Housed in a sturdy wooden case with handle and has a removable cover. Measures  $12\frac{1}{2} \times 10\frac{1}{2} \times 6\frac{3}{4}$  inches.

Weight, 10 pounds.

Description	Price Each
Shallcross Test Set.....	<b>\$220.00</b>

**Type TTS-39BAE Northeast Electronics  
1-Kilocycle, 1-Milliwatt Tone  
Generators**



Has four separate outputs, each of which is isolated from the other by a buffer amplifier in each output. Each output may be used independently of the others. External termination of the tone generator when idle is not required. The tone generator (oscillator) runs continuously. (Additional outputs can be added at will with applique panels containing up to five adjustable buffer amplifiers per panel).

Three outputs each have three leads (tip, ring, and start). The fourth output has tip, ring, and sleeve leads for direct cross-connect with a local connector number. The sleeve lead is isolated from the start leads so that a grounded start lead will not mark the sleeve lead busy. Each output level is individually adjustable in its buffer amplifier.

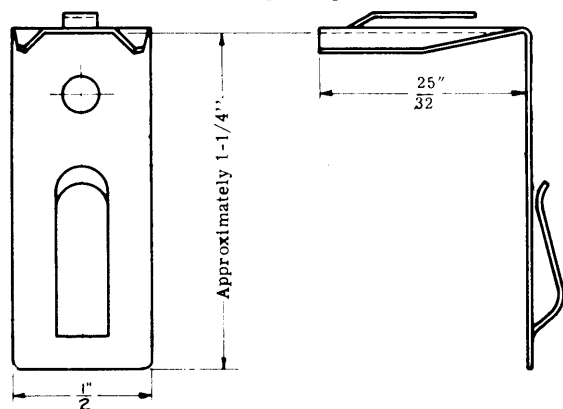
When idle, all four outputs have on-hook supervision. A ground received on any sleeve or start lead starts and repeats (until all grounds are removed) a supervision cycle of 10 seconds off-hook, 1 second on-hook, 10 seconds off-hook, etc. This same d.c. off-hook supervision provides ring trip on the fourth output. The fourth output is designed to withstand ringing voltages, and to isolate them from the other three outputs.

The source impedance of each output is 900 ohms. Output level accuracy and long-term stability is  $\pm 1$  per cent. Harmonic distortion is less than 1 per cent. Central office 48-volt battery supply is required.

The generator occupies 7 inches on a 19-inch relay rack.

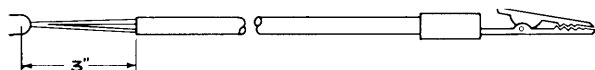
Type	Description	Price Each
<b>TTS-39BAE</b>	1-Kilocycle, 1 Milliwatt Tone Generator.....	<b>\$285.00</b>
	Additional Outputs.....	<b>30.00</b>

## Busy Clips



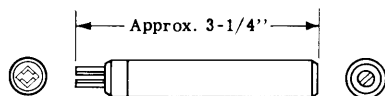
Order No.	Description	Price Each
<b>D-15455-A</b>	For use in busying equipment not equipped with busy key.....	<b>5.26</b>

## Cord and Test Clips



Order No.	Description	Price Each
<b>D-542626-B</b>	Used with a one conductor cord; includes clip and cord.....	<b>\$3.55</b>

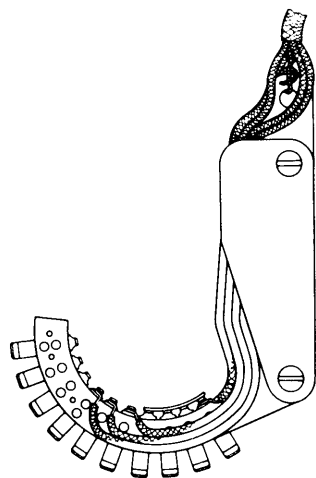
## Lineswitch Test Pencils



For use in testing plunger lineswitch operation.

Order No.	Res. Ohms	Price Each	Order No.	Res. Ohms	Price Each
<b>H-7443-5</b>	500	<b>\$3.50</b>	<b>H-7443-10</b>	1000	<b>\$3.50</b>
<b>H-7443-6</b>	600	<b>3.50</b>	<b>H-7443-12</b>	1200	<b>3.50</b>
<b>H-7443-7</b>	750	<b>3.50</b>	<b>H-7443-13</b>	1650	<b>3.50</b>

## Bank Busying Tools

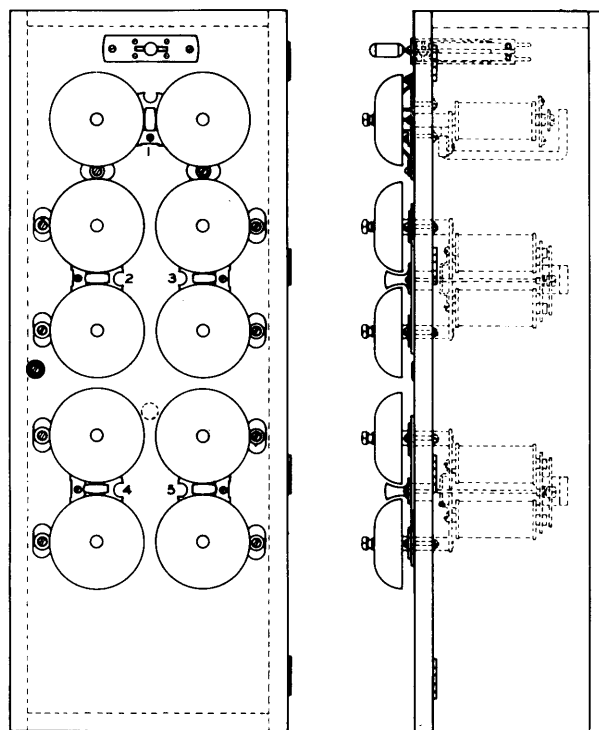


Order No.	Description	Price Each
<b>H-78977-12</b>	10-Point Bank Busying Tool.....	<b>\$18.26</b>
<b>H-78977-1</b>	20-Point Bank Busying Tool.....	<b>21.94</b>

R-34

Prices are subject to change without notice.

## Harmonic Ringer Boxes

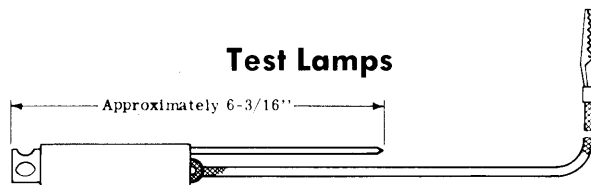


For use with Connector Routine Test Sets.  
Approximately 1'7<sup>3</sup>/<sub>4</sub>" high by 7<sup>1</sup>/<sub>2</sub>" wide by 5<sup>1</sup>/<sub>4</sub>" deep.

Order No.	Description	Price Each
<b>D-40059-A</b>	Multiple ring; frequencies 16.6, 25, 33.3, 50, 66.6.....	<b>\$120.00</b>
<b>D-40059-B</b>	Non-multiple ring; frequencies 20, 30, 42, 54, 66.....	.....*
<b>D-40059-C</b>	Non-multiple ring; no induction coil; frequencies 20, 30, 42, 54, 66.....	<b>120.00</b>
<b>D-40059-D</b>	Multiple ring; no induction coil; frequencies 16.6, 25, 33.3, 50, 66.6.....	<b>120.00</b>
<b>D-40059-E</b>	Multiple ring; no key; frequencies 16.6, 25, 33.3, 50, 66.6.....	.....*
<b>D-40059-F</b>	Non-multiple ring; no key; frequencies 20, 30, 42, 54, 66.....	.....*
<b>D-40059-G</b>	Decimonic ring; no induction coil; frequencies 20, 30, 40, 50, 60.....	<b>120.00</b>

\*Price on application.

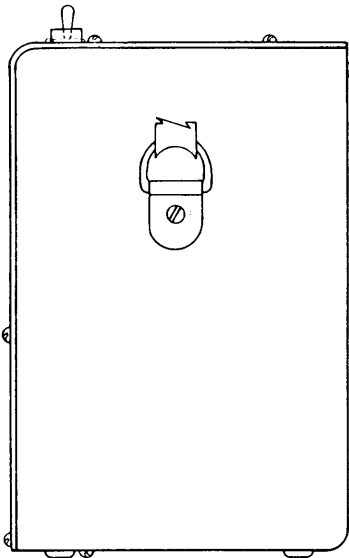
## Test Lamps



For general use.

Order No.	Description	Price Each
<b>H-16339-1</b>	Used with 48-volt switchboard lamp (D-94005-A).....	<b>\$6.74</b>
<b>H-16339-5</b>	Used with 24-volt switchboard lamp (D-94025-A).....	<b>6.74</b>

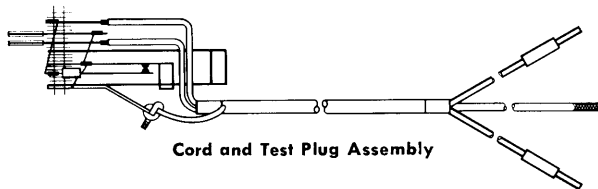
**Buzzer and Talking Test Sets**



For use in trunk testing.

Order No.	Description	Price Each
<b>H-884597-1</b>	Assembly 1—Buzzer and Talking Test Set; consists of dry cells, buzzer, jack, cord, operator's telephone set	<b>\$70.00</b>
<b>H-884597-2</b>	Assembly 2—Talking Test Set, consists of dry cells, jack, operator's telephone set and cord.....	<b>70.00</b>

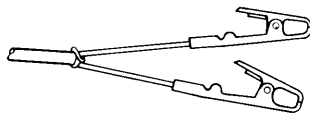
**Miscellaneous Retractable Cord and Plug (or Clip) Assemblies**



**Cord and Test Plug Assembly**



**Cord and Switchboard Plug Assembly**



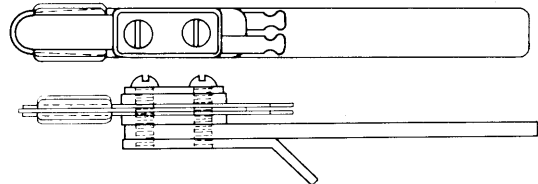
**Cord and Test Clip Assembly**

For use with Type 800 Hand Test Telephone.

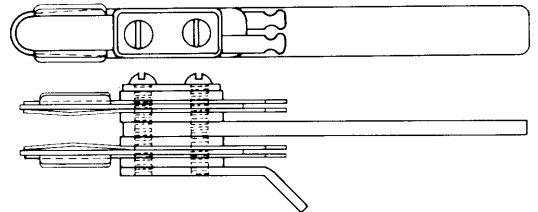
Order No.	Description	Price Each
<b>D-543392-A</b>	Cord and Test Plug Assembly.....	<b>\$4.75</b>
<b>D-543142-A</b>	Cord and Switchboard Plug Assembly.....	<b>4.75</b>
<b>D-543395-A</b>	Cord and Test Clip Assembly.....	<b>2.40</b>

Prices are subject to change without notice.

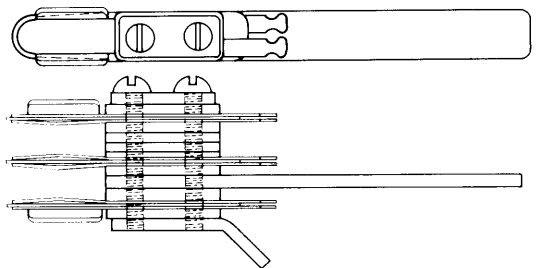
**Test Plugs**



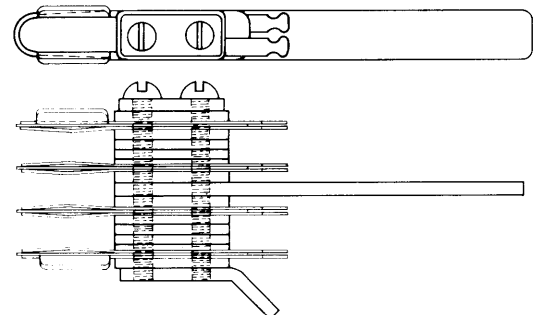
**2-Point**



**4-Point**



**6-Point**



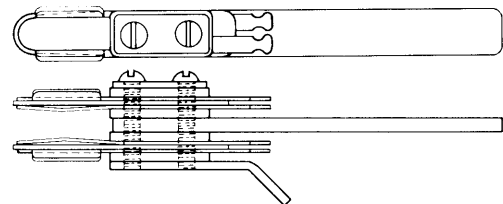
**8-Point**

For use in general testing.

Order No.	Description	Price Each
<b>D-57048-A</b>	2-Point Test Plug.....	<b>\$.62</b>
<b>D-57030-A</b>	4-Point Test Plug.....	<b>.82</b>
<b>D-57037-A</b>	6-Point Test Plug.....	<b>1.52</b>
<b>D-57038-A</b>	8-Point Test Plug.....	<b>2.00</b>
<b>D-57163-A</b>	10-point Test Plug (not shown).....	<b>*</b>

\*Price will be furnished on request

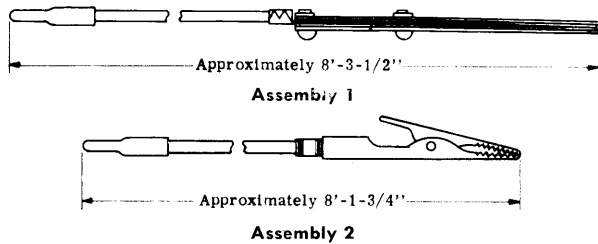
**Test Plugs and Cords**



Used with a 4-conductor cord and spade terminations.

Order No.	Description	Price Each
<b>D-541765-A</b>	Test Plug and Cord.....	<b>\$2.46</b>

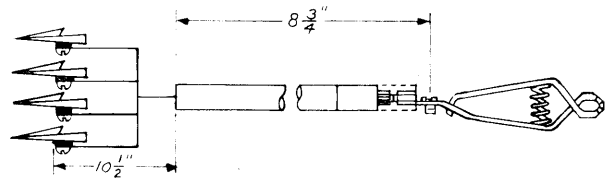
## Test Cords



For use with H-88733-1 Current Flow Test Set.

Order No.	Description	Price Each
<b>H-74573-1</b>	Assembly 1—Test Cord	<b>\$5.21</b>
<b>H-74573-2</b>	Assembly 2—Test Cord	<b>1.21</b>

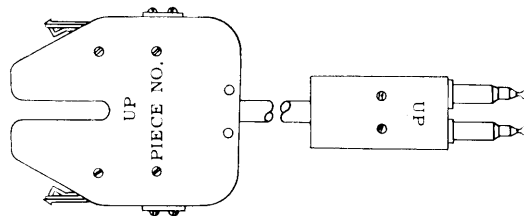
## Ground Cord Assemblies



For use in busying out of order lines.

Order No.	Description	Price Each
<b>D-542407</b>	Ground Cord Assembly	<b>\$2.09</b>

## Main Distribution Frame Test Plug and Cord Assemblies



	12-Foot Cord			18-Foot Cord		
	With Twin Plug for Jack Assembly †Exchange Distributing Frame No.		With Spade Terminal (Replacing Twin Plug) Order No.	With Twin Plug for Jack Assembly †Exchange Distributing Frame No.		With Spade Terminal (Replacing Twin Plug) Order No.
	H-50830-2 Order No.	H-880982-1 Order No.		H-50830-2 Order No.	H-880982-1 Order No.	
For Protector						
A.E. Co. Type 676	<b>D-57068-A</b>	<b>D-57068-H</b>	<b>D-57068-C</b>	<b>D-57068-B</b>	<b>D-57068-J</b>	<b>D-57068-D</b>
A.E. Co. Type 675 10, 20, 21 & 22 pair banks	<b>D-57140-A</b>	<b>D-57140-E</b>	<b>D-57140-C</b>	<b>D-57140-B</b>	.....	<b>D-57140-D</b>
A.E. Co. Type 675 50-51 pair banks	.....	.....	.....	<b>D-57107-A</b>	<b>D-57107B</b>	.....
Cook Electric Co. Type 3800	<b>D-57099-A</b>	<b>D-57099-E</b>	<b>D-57099-C</b>	<b>D-57099-B</b>	<b>D-57099-F</b>	<b>D-57099-D</b>
Cook Electric Co. Type 100	<b>D-57141-A</b>	<b>D-57141-E</b>	<b>D-57141-C</b>	<b>D-57141-B</b>	<b>D-57141-F</b>	<b>D-57141-D</b>
W.E. Co. Type C-50 and C-52†	<b>D-57142-A</b>	<b>D-57142-E</b>	.....	<b>D-57142-B</b>	<b>D-57142-F</b>	.....

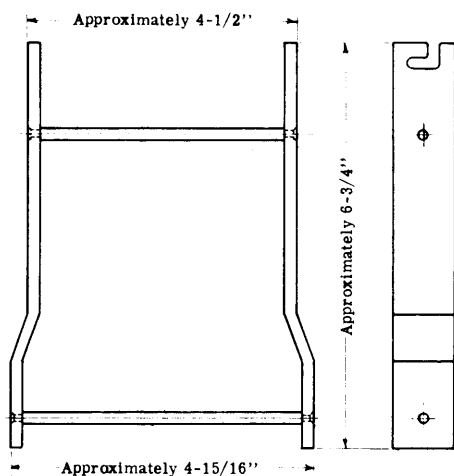
†Test Cord Assemblies Not Supplied with W.E. Co. Protector Test Plug

Order No.	Price Each	Order No.	Price Each	Order No.	Price Each	Order No.	Price Each	Order No.	Price Each	Order No.	Price Each
<b>D-57068-A</b>	<b>\$24.50</b>	<b>D-57068-J</b>	<b>\$26.00</b>	<b>D-57099-E</b>	<b>\$27.75</b>	<b>D-57140-B</b>	<b>\$20.90</b>	<b>D-57141-B</b>	<b>\$20.00</b>	<b>D-57142-A</b>	<b>\$16.45</b>
<b>D-57068-B</b>	<b>26.00</b>	<b>D-57099-A</b>	<b>27.75</b>	<b>D-57099-F</b>	<b>30.00</b>	<b>D-57140-C</b>	<b>13.20</b>	<b>D-57141-C</b>	<b>13.25</b>	<b>D-57142-B</b>	<b>19.60</b>
<b>D-57068-C</b>	<b>16.00</b>	<b>D-57099-B</b>	<b>30.00</b>	<b>D-57107-A</b>	<b>..*..</b>	<b>D-57140-D</b>	<b>16.50</b>	<b>D-57141-D</b>	<b>14.50</b>	<b>D-57142-E</b>	<b>16.30</b>
<b>D-57068-D</b>	<b>18.00</b>	<b>D-57099-C</b>	<b>18.75</b>	<b>D-57107-B</b>	<b>..*..</b>	<b>D-57140-E</b>	<b>17.60</b>	<b>D-57141-E</b>	<b>19.75</b>	<b>D-57142-F</b>	<b>..*..</b>
<b>D-57068-H</b>	<b>24.50</b>	<b>D-57099-D</b>	<b>21.10</b>	<b>D-57140-A</b>	<b>17.60</b>	<b>D-57141-A</b>	<b>19.75</b>	<b>D-57141-F</b>	<b>20.00</b>	.....	.....

†H-50830-2 has 1/2-inch centers; H-880982-1 has 1-inch centers.

\*Price upon application.

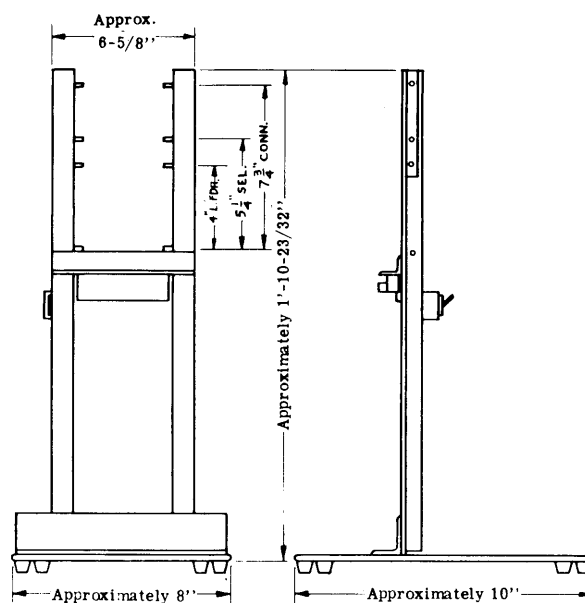
**Switch Supports**



For use in checking rear of Strowger switch while on shelf.

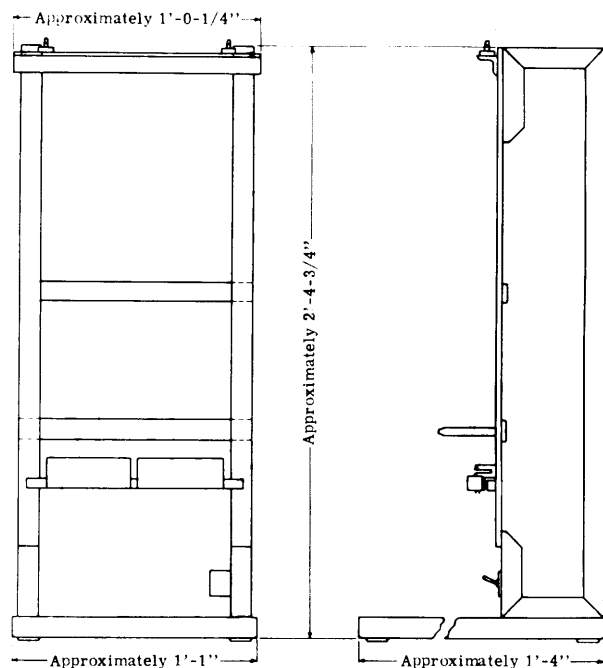
Order No.	Description	Price Each
<b>H-26221-1</b>	Switch Support .....	<b>\$7.20</b>

**Switch Test Stands**



**No. H-881346-1**

**Switch Test Stands**



For use in adjusting and testing ticketer.

Order No.	Description	Price Each
<b>H-880263-1</b>	Test Stand for double width switch base; jack-mounted .....	<b>\$33.02</b>

For use with selectors, connectors, linefinders and miscellaneous relay groups having standard jacks.

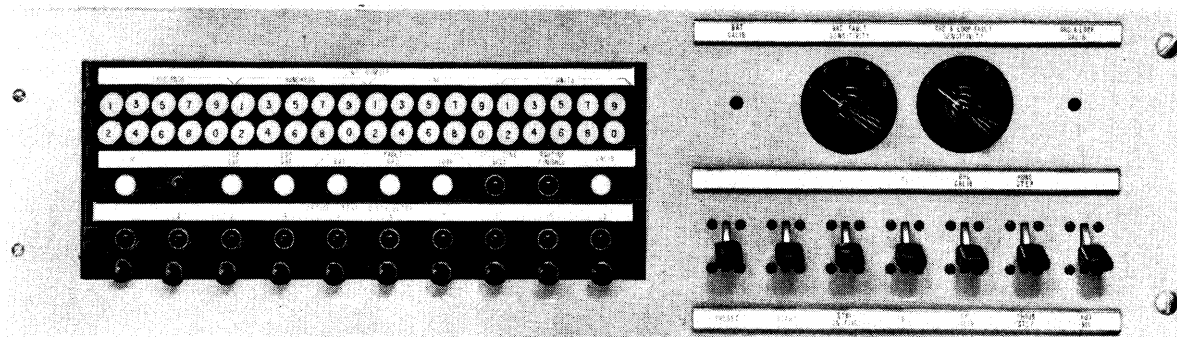
Order No.	Description	Price Each
<b>H-881346-1</b>	Test Stand for connector, selector and linefinder switches; with one AE Co. type 24-point jack .....	<b>\$25.00</b>
<b>H-881346-2</b>	Test Stand for connector switches; with two Navy type 32-point jacks. ....	<b>50.00</b>
<b>H-881346-3</b>	Test Stand for connector, selector and linefinder switches; with one Navy type 32-point jack .....	<b>25.00</b>
<b>H-881346-4</b>	Test Stand for connector, selector, linefinder and toll transmission switches; arranged for three AE Co. type 24-point jacks. ....	<b>45.00</b>
<b>H-881346-5</b>	Test Stand for double width switches (connector mounting); with six Navy type 32-point jacks. ....	<b>55.00</b>
<b>H-881346-6</b>	Test Stand for connector, selector and linefinder switches; with three Navy type 32-point jacks. ....	<b>40.00</b>
<b>H-881346-7</b>	Test Stand for double width switches (connector mounting); with six AE Co. type 24-point jacks. ....	<b>50.00</b>
<b>H-881346-8</b>	Test Stand for triple width switches (connector mounting); with six Navy type 32-point jacks. ....	...
<b>H-881346-9</b>	Test Stand for triple width switches (connector mounting); with six AE Co. type 24-point jacks. ....	...
<b>H-881346-10</b>	Test Stand for SATT Type 59 transmitter; with three Navy type 32-point jacks. ....	...

\*Price upon application.

Prices are subject to change without notice.

# AE'S AUTOMATIC LINE INSULATION ROUTINER

saves you time and money on testing



**CONTROL PANEL UNIT** of Line Insulation Router provides keys for pre-setting as well as visual indications of fault locations.

Faulty line insulation is the largest single source of outside plant trouble. It causes leaks across lines, between lines and from lines to ground. Finding such faults by manual routing is time-consuming and expensive.

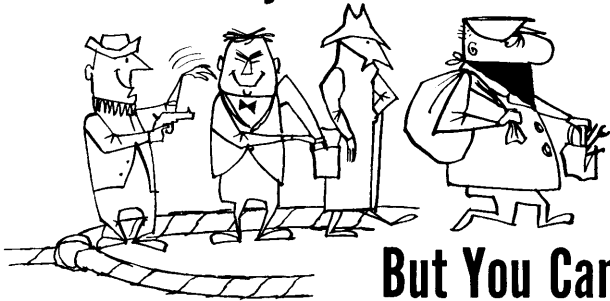
That's why you need the Automatic Line Insulation Router. It tests a 5,000-terminal office in three to four hours (the same job takes 40 to 75 hours manually). And the Router works unattended. Once set in operation, it checks line after line automatically, until the entire office is completed.

A printed record is made of each fault, so your maintenance man need not watch the machine throughout testing. He is freed for other duties.

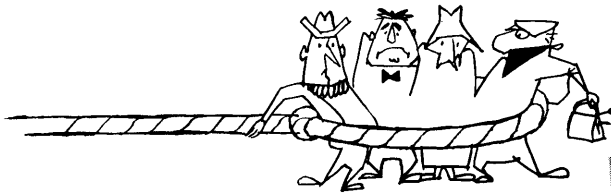
The Router can be set to test up to 10 offices in sequence, without re-setting or attention.

To find out more about the Automatic Line Insulation Router, contact your AE representative or write Automatic Electric Sales Corporation, Northlake, Illinois.

## Some Guys You Can't Trust



## But You Can



## Be Smart



**Get AE  
Paystations!**



... thieves, burglars, robbers, depredators, pillagers, marauders, pirates, poachers, harpies, sharks, crooks, highwaymen, bandits, thugs, pilferers, muggs, housebreakers, bushrangers, yeggs, and people who steal dimes from paystations.

... thwart, baffle, foil, frustrate, defeat, spoil, dishearten, obstruct, stop, bar, bolt, ward off, barricade, inhibit, retard, preclude and restrict these characters.

... able, clever, intelligent, ingenious, talented, resourceful, inventive, shrewd, sharp, cunning, sagacious, adept, adroit and accomplished.

... AE paystations stand up to the roughest treatment. The entire housing is made of solid sheet steel. The coin box door is fitted so closely to the housing that it's impossible to insert a tool. An anti-stuffing device and a 25¢ slug ejector prevent fraud. *For further information, write Automatic Electric Sales Corporation, Northlake, Illinois.*