

MASTER TIMING FRAME
AUTOMATIC MESSAGE ACCOUNTING
PAPER AND MAGNETIC TAPE RECORDING
EQUIPMENT DESIGN REQUIREMENTS
NO. 1, NO. 5 AND CROSSBAR TANDEM
NO. 4 TYPE TOLL SWITCHING, AND STEP-BY-STEP SYSTEMS

1. GENERAL

Scope

1.01 This specification, together with the supplementary information listed herein covers the equipment design requirements for the framework, equipment, and circuits to be used in the engineering, manufacture, and installation of the master timing frames.

1.02 For the purpose of clarity in this specification references to the master timing circuit and frame arranged for magnetic tape recording shall be identified by AMA-MTR.

1.03 This specification is reissued:

- (a) To change the title of the J Specification to add reference to Paper and Magnetic Tape Recording and to change Tandem Crossbar to Crossbar Tandem
- (b) To add J22451F, J22451FA, J22451FB, J22451FC, J22451FD, J22451FE, and J22451FF, covering the equipment design requirements for a master timing frame per SD-94811-01, Issue 2D, required when No. 5 Crossbar LAMA offices are arranged for magnetic tape recording (AMA-MTR)
- (c) To add J22451G per SD-94806-01, Issue 2D to cover equipment design requirements for a transfer and make-busy unit required for operation with AMA-MTR.

- (d) To add information on mutilated hour entries for J22451C and J22451D per SD-25633-01, Issue 38B.

Capacity

1.04 The master timing frame for paper tape recording accommodates one master timing circuit capable of serving the recorders associated with one group of transverters. The master timing frame arranged for magnetic tape recording serves one recorder-recorder control frame (RRC) associated with one transverter group.

Description

1.05 Master Timing Circuit for paper tape recording, SD-25633-01, includes an odd and an even timing circuit and a recorder test circuit. One of the two timing circuits supplies time pulses every 6 seconds to all recorders of a transverter group, there being transfer facilities to permit this function to be assumed by either the odd or even circuit. The time record in minutes and tenths of a minute, entered on the tape by the recorders and associated perforators, is determined by the setting of three 206-type selectors provided in each recorder, one of these selectors being advanced by ground pulses from the master timing circuit every 6 seconds. Similar selectors are provided in each of the two master timing circuits for determining the hour, day, and month, and for checking the 60-minute selectors in the recorders. At intervals of 1 minute, the timing circuit in control checks the other timing circuit and all recorders for synchronization and

brings in an alarm in the event of trouble. A key is provided for controlling any selectors that are out of synchronism with the master timer. At the start of each hour, the master timing frame supplies the recorders with hour information for entry on the tapes, and at 3:00 a.m., an end-of-tape pattern is placed on each recorder tape. This entry is under the control of the master timing frame; the odd master timer controlling the odd recorders and the even master timer the even recorders with transfer facilities to permit either master timer to perform this function for all recorders. The end-of-tape pattern includes the month, day, hour, recorder number, marker group number (identifier group in step-by-step offices), and the round and day of round. It also contains a special pattern defining where the tape shall be cut for removal to the accounting office for processing. In addition to the above functions, the master timing frame is arranged to test certain features of the recorders, including a check of the operation of the 28 magnets of the recorder perforator, a check of the recorder number leads, and the operation of recorder relays not checked in service. These tests are under the control of the odd master timer. A further function of the master timing frame is to supply day, hour, and minute timing to the trouble recorder frame for entry on the trouble recorder cards.

1.06 When used in tandem, No. 4A or 4M offices the functions of the master timing frame for paper tape recording are the same as outlined above, except that provision is made for entering the recorder group number in the end-of-tape pattern instead of the marker group number.

1.07 The master timing frame for paper tape recording for No. 1 crossbar, crossbar tandem, No. 1 step-by-step, and No. 4A or 4M offices is a single-bay, bulb-angle framework 11-feet 6-inches high and 2-feet 10-inches long. Metal casings are used on the front and rear of the frame to protect the equipment from dust. The frame for No. 5 crossbar is a sheet metal structure 11-feet 6-inches high and 2-feet 9-9/16 inches long. Dust protection is provided by transparent covers on the front of the frame and metal covers on the rear. The arrangement of the equipment on the two frames is essentially the same, except that on the bulb-angle frame space limitations make it necessary to locate the fuse panel exterior to the frame as covered in 5.04 and 5.05.

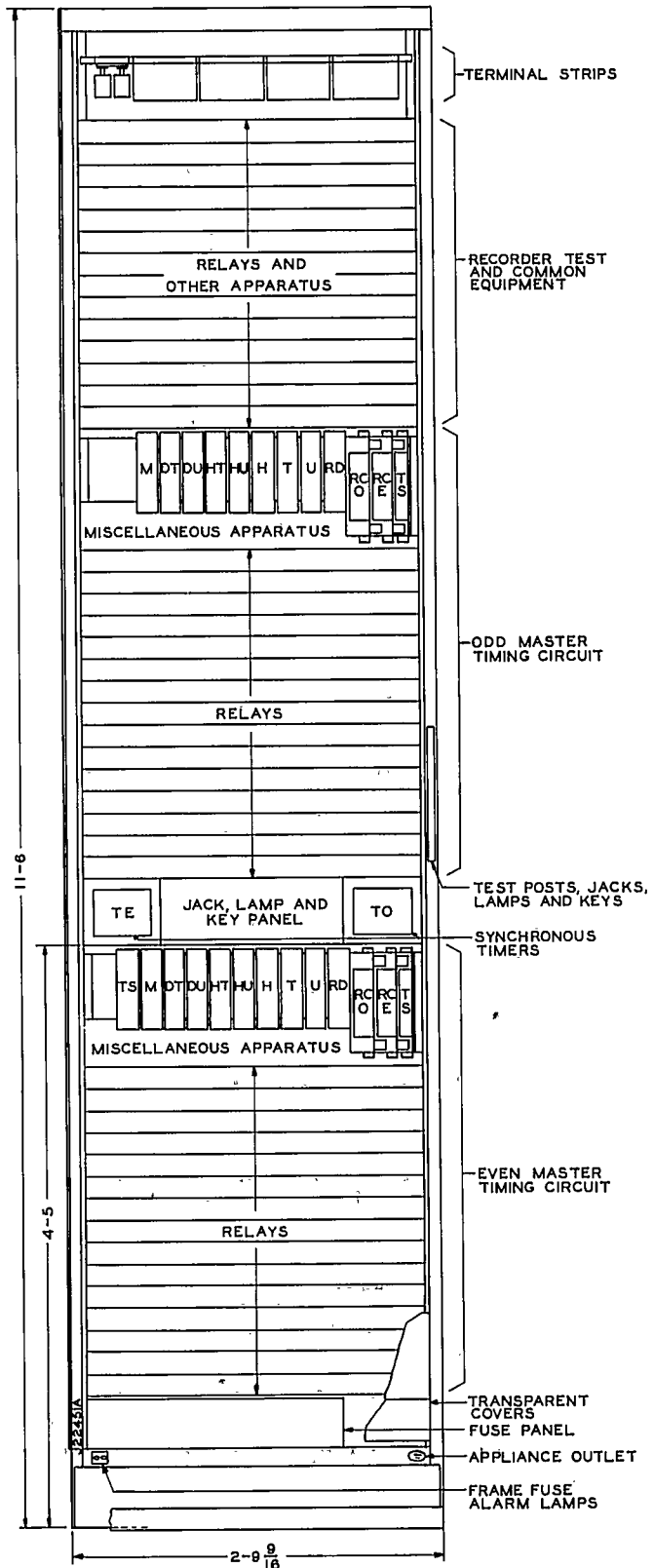


Fig. 1—Master Timing Frame—No. 5 Crossbar System

1.08 The master timing circuit for magnetic tape recording (AMA-MTR), SD-94811-01, is required when No. 5 crossbar LAMA offices are arranged for automatic message accounting using magnetic tape. The frame is similar to the paper tape variety in that it contains an odd and even timing circuit pulsed by clock-type interrupters. Its data, however, is transmitted to the recorder-recorder control frame to be recorded on magnetic tape. This data is in terms of months, days, and 24-hour clock hours, minutes, and seconds, which become part of the AMA record. It is accurate to the nearest second, and at any one time, the odd or even timing circuit is in control of providing its output to one-of-two incremental tape recorders located on the recorder-recorder control frame. Meanwhile, the other timing circuit (odd or even) serves as a backup in case of any detected time differences. A continual check is made between the odd and even counting units to insure that they are in agreement. Sync tests guarantee time accuracy even when one of the units is out of service. Answer and disconnect timing entries contain time data in seconds and are provided by the master timing frame. In order to establish a real time correspondence, time entries in hours and minutes are also initiated by this frame and are recorded every minute on the tape. At 3:00 a.m., a tape transfer or day change entry or label must be recorded. In addition, an irregular transfer label may be initiated whenever the status of the tape recorder units is to be changed (ie: active or standby). These labels or administrative entries contain month, day, hour, and minute data, as well as the office and tape recorder unit identification, and are recorded under control of the master timing frame. Minute entry and 3:00 a.m. day change tests can be performed under manual control at the master timing frame. Trouble records can be initiated whenever a trouble is detected, and time data is provided for all trouble recorder cards when required.

1.09 The AMA-MTR master timing frame for use in No. 5 crossbar LAMA offices is a sheet metal structure 11 feet 6 inches high and 2 feet 2-1/16 inches long (Fig. 2). The equipment is arranged in subunits above and below the control panel which physically separates the even and odd timing circuits. A recessed section of the control

panel assembly, located on the left side of the frame accommodates two synchronous clock interrupters which pulse the timing circuits. The transfer and make-busy unit is located near the top of the frame just below the frame terminal strips.

1.10 The transfer and make-busy circuit per SD-94806-01, functions with AMA-MTR to automatically make a recorder-recorder control connector channel busy and to signal the RRC to transfer control from one tape recorder circuit to the other when certain repetitive troubles are detected. The transfer and make-busy unit is a surface-wired unit and occupies the space of seven mounting plates. It was located on the master timing frame mainly because of its close proximity to the RRC frame.

2. SUPPLEMENTARY INFORMATION

814-000-000—Step-by-Step Systems Index
 816-000-000—No. 1 Crossbar System Index
 817-000-000—Crossbar Tandem System Index
 818-000-000—No. 4 Type Toll Switching Systems Index
 819-000-000—No. 5 Crossbar System Index
 AA128.006—List of General Equipment Requirements Sections
 J22457—816-104-100—Automatic Message Accounting General—No. 1 Crossbar System
 J29253—817-010-100—General Outline—Tandem Crossbar System
 J29259—819-005-150—General Outline—No. 5 Crossbar System
 J69202—818-005-150—General Specification for Toll Office Equipment, No. 4A Toll Switching System

Floor Plan Data

Section 9.2,
 Sheet 13—No. 1 and Crossbar Tandem Offices
 Section 11.1—No. 5 Crossbar Offices
 Section 5.2
 Sheet 42—No. 1 Step-by-Step Offices
 Section 10.1,
 Sheet 37—No. 4A or 4M Toll Switching Systems

J22451, ISSUE 11
SECTION 814-117-151, 816-106-150, 817-105-150, 818-112-150, 819-120-150

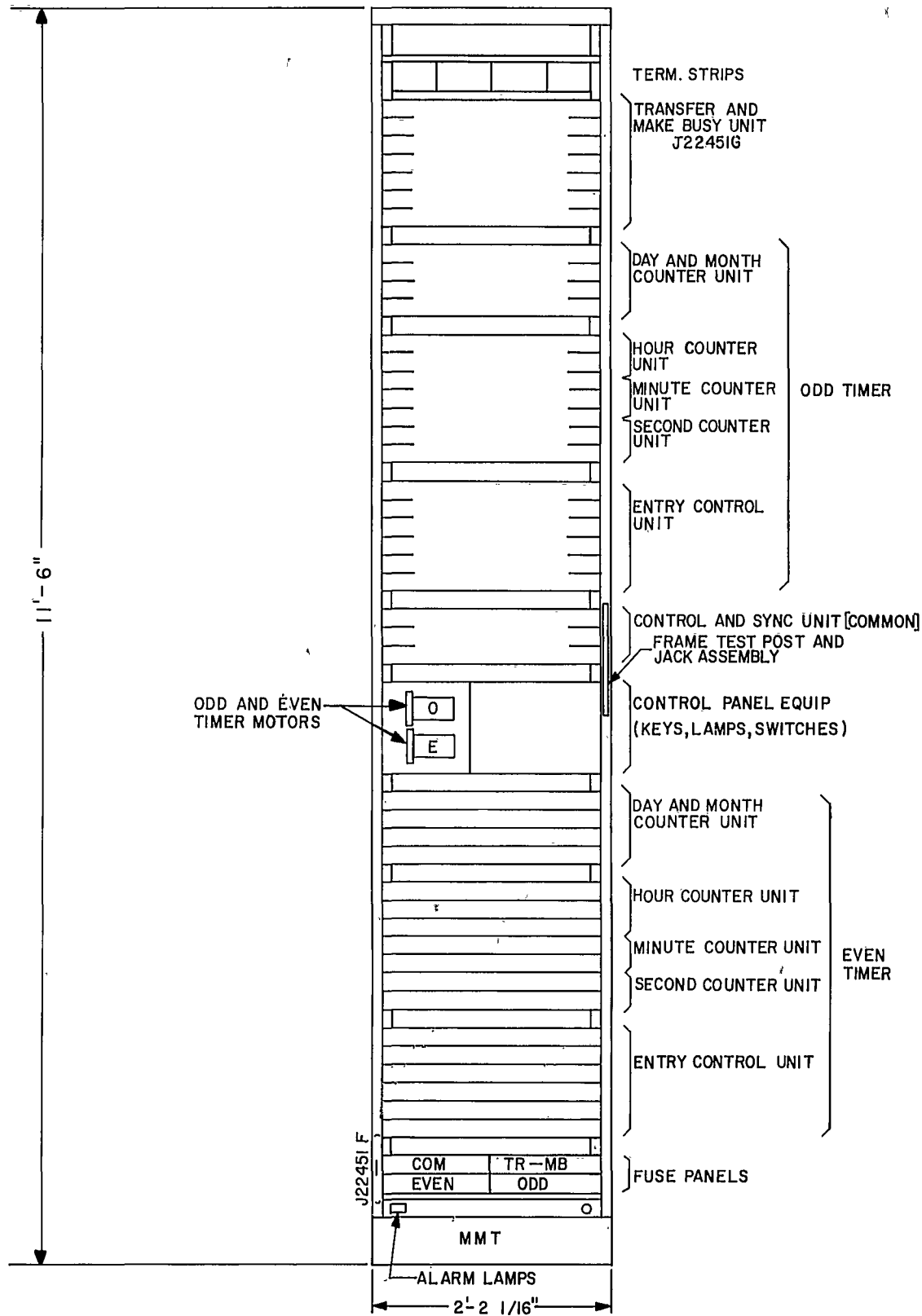


Fig. 2

3. DRAWINGS

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

Keysheets

SD-25000-01—No. 1 Crossbar System
 SD-25435-01—Crossbar Tandem
 SD-25760-01—No. 5 Crossbar System
 SD-32230-01—No. 1 Step-by-Step System
 SD-68400-01—No. 4A Toll Switching System
 SD-68470-01—No. 4M Toll Switching System

Framework and Equipment

ED-26310-12—Fuse Panels for Master Timing Frames in No. 1 Crossbar, Crossbar Tandem, No. 1 Step-by-Step and No. 4A or 4M Offices
 J22451C()—Master Timing Frame—No. 5 Crossbar
 J22451D()—Master Timing Frame—No. 1 Crossbar, Crossbar Tandem, and No. 4A or 4M Toll
 J22451E()—Master Timing Frame—No. 1 Step-by-Step
 J22451F()—Master Timing Frame AMA-MTR No. 5 Crossbar
 J22451G()—Transfer and Make-Busy Unit—AMA-MTR No. 5 Crossbar

Cabling

ED-26180-10—Switchboard Cabling Plan and Details—No. 5 Crossbar
 ED-26311-10—Switchboard Cabling Plan and Details—No. 1 Crossbar and Crossbar Tandem
 ED-31232-10—Switchboard Cabling Plan and Details—No. 1 Step-by-Step
 ED-26311-20—Switchboard Cabling Plan and Details—No. 4A or 4M Toll Switching System
 ED-27803—Switchboard Cabling Plan and Details—AMA-MTR—No. 5 Crossbar

4. EQUIPMENT

ED-26310-12—Fuse Panels for Master Timing Frames in No. 1 Crossbar, Crossbar Tandem, No. 1 Step-by-Step, and No. 4A or 4M Offices

Group 1—Fuse panel for master timing frame in No. 1 office. (See 5.04.)

Group 2—Fuse panel for master timing frame in No. 1 step-by-step office. (See 5.05.)

Group 3—Fuse panel for master timing frame in crossbar tandem and No. 4A or 4M offices. (See 5.04.)

Group 4—Fuse panel for master timing frame to be located on miscellaneous relay rack in No. 4 or 4M toll office.

J22451C—AT&T Co Std—Master Timing Frame—No. 5 Crossbar

Equipment—J22451C()

List 1—Framework, assembly, wiring, and common equipment for one master timing frame.

WIRE EQUIP NOTES

Master Timing Ckt,
 SD-25633-01:

Fig. 3, 18, 19, 20, 21, 22,	1	1
23, & 26, ZO & ZP Opts	1	1
Fig. 1, 2, 7 & 9, XH Opt	1	1
Fig. 4, 8, 17, & 24, V,		
Z, ZF, ZK, ZN, XE,		
& XG Opts	2	2
Fig. 5 & 6	10	10
Fig. 10, 12, 13, 14,		As
& 16	1	Spec
Fig. 11 & 15	8	0

Misc Ckt,

SD-25574-01:

Fig. 10, 13, 16, 17, 36,	1	1
37, 39, & 43, Z Wiring		
Fig. 3, 6, 9, 33, 34,		
& 35	2	2
		As
Fig. 38	11	Spec
Fig. 29	1	0

List 2—Equipment per SD-25633-01, Fig. 13, 14, 15, or 16 required in addition to list 1 for the emergency or each odd recorder (ST relay).

List 3—Equipment per SD-25633-01, Fig. 10, 11, or 12 required in addition to list 1 for each even recorder (ST relay).

List 6—Equipment per SD-25574-01, Fig. 38 required

in addition to list 1 for each recorder (OS lamp).

List 9—Equipment per SD-25633-01, Fig. 29 required in addition to list 1 in offices having both LAMA and CAMA to provide call count process control register transfer.

List 10—Wiring and equipment per SD-25633-01, Fig. 30 and WG option required in addition to list 1 for paper take-up alarm in AMA perforator cabinets. (See Note E.)

List 11—Wiring and equipment per SD-25633-01, Fig. 31, less WR options, required in addition to list 1, to confine mutilated hour entries to those recorders that are out of synchronism. (For offices with recorders EM, 0-10.)

List 12—Wiring and equipment per SD-25633-01, Fig. 31, WR option only, required in addition to list 11, to confine mutilated hour entries to those recorders that are out of synchronism. (For offices with recorders 11-19.)

Notes

- A. Option Z in Fig. 4 of SD-25633-01 consisting of a strap on the DU selector shall be removed during leap year to advance the M selector at the end of a 28-day month.
- B. The fuses for the A and TBS battery supply is SD-25574-01 shall be located on the PRD frame.
- C. When office is arranged for LAMA only wiring option ZY in Fig. 8 of SD-25633-01 shall be furnished. When office is arranged for both LAMA and CAMA and/or for more than one recorder group number wiring option ZZ in Fig. 8 of SD-25633-01 shall be furnished.
- D. Option XT in Fig. 13 of SD-25633-01 shall be connected when this circuit is provided in offices with only one emergency and one regular recorder.
- E. When the office is arranged for more than ten perforators (10-19), lamps and diodes per WF option in Fig. 30 of SD-25633-01, shall be furnished.

J22451D—AT&TCo Std—Master Timing Frame—No. 1 Crossbar, Crossbar Tandem, and No. 4A or 4M Toll

Equipment—J22451D-()

List 1—Framework, assembly, wiring, and common equipment for one master timing frame. (See 5.04.)

	WIRE	EQUIP	NOTES
Master Timing Ckt, SD-25633-01:			
Fig. 3, 18, 19, 20, 21, 22, & 26	1	1	
Fig. 1, Less XZ Opt			
Fig. 2, 7, 9 & XH Opt	1	1	
Fig. 4, Less XS, XW, & XX Opt,			
Fig. 8, 17, & 25 With Z, XE, XG, XV, and ZK Opt	2	2	
Fig. 5 & 6	10	10	
Fig. 10, 12, 13, 14 & 16			1 As Spec
Fig. 11 & 15			8 As Spec
Fig. 31 & WR Option	1	0	
Misc Ckt, SD-25630-01:			
Fig. 1, 18 or 20, 3 or 19, 7 & 8	2	2	E
Fig. 2, 4, 5, 6, 10, 11, 12, 13, & 14, Z Opt	1	1	
Fig. 9	21	As Spec	
Fig. 23	1	0	

List 2—Equipment per SD-25633-01, Fig. 13, 14, 15, or 16 required in addition to list 1 for the emergency or each odd recorder (ST relay).

List 3—Equipment per SD-25633-01, Fig. 10, 11, or 12 required in addition to list 1 for each even recorder (ST relay).

List 6—Equipment per SD-25630-01, Fig. 9 required in addition to list 1 for each recorder (OS lamp).

List 9—Wiring per SD-25633-01 for four Fig. 27 and one Fig. 28 and equipment per SD-25633-01, Fig. 28 required in addition to list 1 in tandem or No. 4A or 4M offices

for all count process control.

List 10—Equipment per SD-25633-01, Fig. 27 required in addition to lists 1 and 9 in tandem or No. 4A or 4M offices for call count process control for regular recorders 0 to 5, 6 to 11, 12 to 17, or 18 and 19.

List 11—Equipment per two Fig. 17, W apparatus only, required in addition to list 1 crossbar tandem offices having TVTI frames and in No. 1 crossbar offices.

List 12—Equipment per two Fig. 17, XM apparatus only, and one Fig. 23 required in addition to list 1 in tandem crossbar offices having trouble recorders.

List 13—Equipment for Fig. 3 and two Fig. 17, XO apparatus only, and for one Fig. 23 required in addition to list 1 when master timing frame is required for No. 4A or 4M offices. (See Note B.)

List 16—Wiring and equipment per SD-25633-01, Fig. 1, XZ option only required in addition to list 1 when traffic service position 100A is provided.

List 17—Wiring and equipment per SD-25633-01, Fig. 4, WC and WI options required in addition to list 1 for centralized coin zone coin toll dialing.

List 18—Wiring and equipment per SD-25633-01, Fig. 30 and WG option required in addition to list 1 for paper take-up alarm in AMA perforator cabinets. (See Note F.)

List 19—Wiring and equipment per SD-25633-01, Fig. 4, WI option required in addition to list 17 to provide an additional time pulse on the hour.

List 20—Equipment per SD-25633-01, Fig. 31, less WR option, required in addition to list 1, to confine mutilated hour entries to those recorders that are out of synchronism. (For offices with recorders EM, 0-10.)

List 21—Equipment per SD-25633-01, Fig. 31, WR option only, required in addition to list 20, to confine mutilated hour entries to those recorders that are out of synchronism. (For offices with recorders 11-19.)

Notes

A. List 1 covers the basic frame and No. 4A or 4M toll for No. 1 crossbar, crossbar tandem, less the call count process control feature for tandem and No. 4A or 4M which is covered by lists 9 and 10. Furnish lists 9 and 10 as

specified by the telephone company. For No. 1 offices provide ZY option and marker group cross-connections at the MGN terminal strips. For tandem and No. 4A or 4M offices provide ZZ option and omit cross-connections at the MGN terminal strips.

B. Wiring options ZF, ZG, ZO, ZP, ZQ, and ZR in Fig. 17 and 21 shall be furnished as required depending upon whether the transverter trouble indicator or trouble recorder serves one or two marker groups or one or two transverter groups and associated master timing frames. Wiring options W, XM, and ZB in Fig. 8, 17, and 20 shall be furnished, as required, depending on whether the office is a No. 1 or tandem and if it has a transverter trouble indicator or a trouble recorder. Wiring operation ZY or ZZ in Fig. 8 shall be furnished depending on whether the office is a local, tandem office, or No. 4A or 4M. Wiring option X0 is furnished for No. 4A or 4M.

C. Option Z in Fig. 4 of SD-25633-01 consisting of a strap on the DU selector shall be removed during leap year to advance the M selector at the end of a 28-day month.

D. The MTE and MTO +130 volt fuses called for on SD-25633-01 and the A and TBS 48-volt fuses shown on ED-25630-01 are located on a miscellaneous fuse bay.

E. Furnish Fig. 1 and 3 for No. 1 crossbar, using 35-type fuse panel, Fig. 18 and 19 for crossbar tandem using 70-type fuse panel, and Fig. 19 and 20 for No. 4A or 4M using 70-type fuse panel.

F. When the office is arranged for more than ten perforators (10-19), lamps and diodes per WF option in Fig. 30 of SD-25633-01 shall be furnished.

J22451E—AT&TCo Std—Master Timing Frame—No. 1 Step-by-Step

Equipment—J22451E-()

List 1—Framework, assembly, wiring, and common equipment for one master timing frame. (See 5.05.)

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WIRE EQUIP NOTES

**J22451F—AT&TCo Std—Master Timing Frame
for AMA-MTR, No. 5 Crossbar**

Master Timing Ckt,
SD-25633-01:

Equipment—J22451F-()

Fig. 3, 18, 19, 20, 21, 22, 23, & 26, ZO, & ZP Opts	1	1
Fig. 1, 2, 7, & 9, XH Opt	1	1
Fig. 4, 8, 17, & 25, V, Z, ZF, ZK, XE, XG, XJ, & ZY Opts	2	2
Fig. 5 & 6	10	10
Fig. 10, 12, 13, 14, & 16	1	As Spec
Fig. 11 & 15	3	As Spec

List 1—Framework, assembly, wiring, and equipment for one master timing frame for use in No. 5 crossbar offices equipped with automatic message accounting arranged for magnetic tape recording.

Misc Ckt,

WIRE EQUIP NOTES

SD-25630-01:		
Fig. 7, 8, 15, 16, & 17	2	2
Fig. 5, 6, 10, 11, 12, 13, & 14, Z Opt	1	1
Fig. 9	11	As Spec

Master Timing Circuit —

SD-94811-01:

Fig. 1, 2, 3, 6, 7, & Z Option	2	0	A
Fig. 4	1	0	
Keys, Lamps, Switches, Fig. 5	1	1	

Miscellaneous Ckt —

SD-25574-01:

Fig. 10, 13, 16, 17, 49, 91, 92	1	1	
Fig. 90	4	4	

Transfer and Make-Busy

Ckt — SD-94806-01:

Fig. 1	1	0	A
Fig. 2	3	0	

Hour Counter Unit —

J22451FA, List 1	0	2	
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Day & Month Counter

Unit — J22451FB, List 1	0	2	
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Entry Control Unit —

J22451FC, List 1	0	2	
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Control and Sync Unit —

J22451FD, List 1	0	1	
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Minute Counter Unit —

J22451FE, List 1	0	2	
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Second Counter Unit —

J22451FF, List 1	0	2	
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Transfer and Make-Busy

Unit — J22451G, List 1	0	1	
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List 2—Equipment per SD-25633-01, Fig. 13, 14, 15, or 16 required in addition to list 1 for the emergency or each odd recorder (ST relay).

List 3—Equipment per SD-25633-01, Fig. 10, 11, or 12 required in addition to list 1 for each even recorder (ST relay).

List 4—Equipment per SD-25630-01, Fig. 9 required in addition to list 1 for each recorder (OS lamp).

List 5—Wiring and equipment per SD-25633-01, Fig. 30 and WG option required in addition to list 1 for paper take-up alarm in AMA perforator cabinets.

Notes

- A. The A and TBS 48-volt fuses shown on SD-25630-01 are located exterior to the frame on a miscellaneous fuse bay.
- B. The even and odd +130 volt leads to SD-25630-01, Fig. 14 shall be protected by 5.1-ohm resistances and 0.180-ampere fuses. These are located exterior to the frame on a miscellaneous fuse bay.
- C. Option Z in Fig. 4 of SD-25633-01 consisting of a strap on the DU selector shall be removed during leap year to advance the M selector at the end of a 28-day month.

List 2—Equipment per J22451G, List 2 required in addition to list 1 for binary counters and timeout checks when recorder and recorder control frame is equipped for third channel operation.

Note

- A. All interunit wiring and battery and ground leads are provided in the frame local cable.

J22451G—AT&TCo Std—Transfer and Make-Busy Unit for AMA-MTR

Equipment—J22451G-()

List 1—Framework, assembly, wiring, and equipment for one transfer and make-busy unit per SD-94806-01, Fig. 1 and two Fig. 2 arranged for two recorder-recorder control channel operation. (See Note A.)

List 2—Equipment and wiring per SD-94806-01, Fig. 2 required in addition to list 1 to arrange transfer and make-busy unit for third recorder-recorder control channel operation.

Note

- A. This unit mounts on the master timing frame arranged for AMA-MTR J22451F.

J22451FA—AT&TCo Std—Hour Counter Unit

Equipment—J22451FA-()

List 1—Framework, assembly, wiring, and equipment per SD-94811-01, Fig. 1, for one-hour counter unit

J22451FB—AT&TCo Std—Day and Month Counter Unit

Equipment—J22451FB-()

List 1—Framework, assembly, wiring, and equipment per SD-94811-01, Fig. 2, for one day and month counter unit.

J22451FC—AT&TCo Std—Entry Control Unit

Equipment—J22451FC-()

List 1—Framework, assembly, wiring, and equipment per SD-94811-01, Fig. 3 and SD-94820-01, two Fig. 2 for one entry control unit.

J22451FD—AT&TCo Std—Control and Sync Unit

Equipment—J22451FD-()

List 1—Framework, assembly, wiring, and equipment per SD-94811-01, Fig. 4 and Z option for one control and sync unit.

J22451FE—AT&TCo Std—Minute Counter Unit

Equipment—J22451FE-()

List 1—Framework, assembly, wiring, and equipment per SD-94811-01, Fig. 6, for one minute counter unit.

J22451FF—AT&TCo Std—Second Counter Unit

Equipment—J22451FF-()

List 1—Framework, assembly, wiring, and equipment per SD-94811-01, Fig. 7, for one second counter unit.

5. GENERAL NOTES

5.01 All wiring options shown in the circuit figures for the three master timing frames for paper tape recording shall be included in the respective frame local cables and shall be connected as required for each job.

5.02 On frames arranged for paper tape recording No. 24 gauge type C wire shall be used for all local cable wiring. No. 22 gauge type BH wire shall be used for the magnet, brush, and interrupter terminals of the 206-type selectors. On the (AMA-MTR) frame No. 24 gauge BU wire shall be used.

5.03 The ac supply for the 22-volt ac power unit for the synchronous timers on the master timing frame shall be obtained over a separate pair of leads from the battery-operated emergency ac supply unit. This unit shall obtain its power from an emergency ac supply, the frequency of which shall never exceed 60 cycles. When 50-volt ampere power supply per J86724A is used to provide 22-volt ac power, the 1-1/3 ampere fuses shall be located on a miscellaneous fuse board. No alarm is provided with these fuses, the pulse failure alarm being sufficient to indicate power failure.

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5.04 The 48-volt fuse panel for the No. 1 crossbar and tandem crossbar master timing frame is located at the top of the outgoing trunk test frame when nearby, either in the O jack bay or the jack bay nearest the master timing frame. When the outgoing trunk test frame is not nearby or when the master timing frame is located elsewhere than in the maintenance center, the fuse panel is mounted at the top of the nearest miscellaneous relay rack bay. When located on a relay rack bay or on outgoing trunk test frame per J98501, it is necessary to drill two holes centrally in the front-top angle and ground bar for mounting the fuse panel. In No. 4A or 4M offices, the fuse panel for the master timing frame shall be located on a miscellaneous relay rack.

5.05 The -48 volt fuse panel for the No. 1 step-by-step master timing frame is located at the top of the trouble recorder frame No. 2 when nearby, as shown on ED-31414-01. Otherwise, the fuse panel shall be located on a nearby miscellaneous relay rack bay.

5.06 Where a master timing frame for paper tape recording is required to provide time-of-day information to a trouble recorder in a No. 4A office without CAMA, it must be arranged with trouble recorder options.

5.07 All references to No. 1 step-by-step in this specification refer to step-by-step with AMA. Requirements for step-by-step intertoll offices with CAMA are covered in J38909.

List of A&M Only and Mfr Disc. Equipment

EQUIPMENT	RATING	DETAILS LAST SHOWN IN ISSUE	REPLACING EQUIPMENT
J22451A	Mfr Disc.	2	J22451C
J22451B	Mfr Disc.	2	J22451D
J22451C,L4, L5, & L7	Mfr Disc.	5	J22451C,L8
L8	Mfr Disc.	5	J22451C,L1
J22451D,L4, L5, & L7	Mfr Disc.	5	J22451D,L8
L8	Mfr Disc.	5	J22451D,L1
J22451D,L14 & L15	Mfr Disc.	6	J22451D,L17

The above equipment has been replaced as indicated. Where A&M Only items appear, the issue numbers shown are those of the issue in which the rating was first applied.

Bell Telephone Laboratories, Incorporated

Dept 5411