28 AND 35 ANSWER-BACK UNIT (LABD)

INSTALLATION

1. GENERAL

1.01 This section provides instructions for unpacking, installing, and connecting the self-contained answer-back unit.

1.02 This section has been revised to include recent engineering changes and additions, and to rearrange the text, so as to bring the section generally up-to-date. Since this is a general revision, marginal arrows used to indicate changes have been omitted.

1.03 The unit is mechanically independent of any other equipment. Only electrical connections for power and control circuits are required.

1.04 References made to left or right, up or down, and front or rear apply to the answer-back unit as viewed from the side with the answer-back mechanism to the left and the motor to the right.

UNPACKING

1.05 Open shipping carton carefully. Be sure the carton is resting top side up. Clip any strapping and carefully cut or slit paper tape or fiber carton seals to avoid damage to finished surfaces of the equipment.

2. COMPONENTS

2.01 The self-contained answer-back unit consists of the cover, base, motor, answer-back mechanism, terminal block, fuse, fuse-holder, and capacitor.

2.02 The unit is shipped completely assembled with the exception of the speed change gears which are ordered separately for the desired operating speed. Gear sets are available for both 5- and 8-level operation as shown below:

LEVEL	UNIT CODE	SPEED WORDS PER MINUTE	GEAR SET
5	7.42	60	TP305047
		100	TP305048
5	7.5	60	TP194808
		66	TP199096
		75	TP194809
		100	TP194815
8	11.0	100	TP194815

2.03 The unit may be placed on any hard, flat horizontal surface, or on a cabinet, rack, or shelf. A soft surface or pad should not be used since the free flow of exhaust air will be restricted. The louvered end of the unit should be placed at least one inch from the wall or any other obstructing area which might restrict the air intake.

2.04 The answer-back mechanism is the principle electromechanical component, and may be mounted in the self-contained answer-back unit, or 35 Automatic Send-Receive (ASR), Keyboard Send-Receive (KSR), or Receive-Only (RO) Teletypewriter Set.

2.05 The answer-back mechanism, when mounted in 35-type equipment is normally factory assembled and installed as a part of the base.

3. INSTALLATION

SPEED CHANGE GEARS

3.01 Loosen the cover fastening screws and remove the cover. Remove the screw from the motor shaft and install the pinion. Remove the three gear mounting screws

from the clutch sleeve and install the drive gear. Apply a thin coat of grease on the gears.

3.02   Make the gear mesh adjustment as given in the appropriate section which covers the answer-back unit and mechanism adjustments.

POWER AND CONTROL CIRCUITS

3.03   All electrical connections are made to the terminal block on the base plate. Connections to this block are made with spade-type terminal lugs inserted under the screws on the block. Consult the following wiring diagrams for the 5- and 8-level answer-back units:

    (a)   5-level unit – WD4728

    (b)   8-level unit – WD6378

4.   CODING ANSWER-BACK DRUM

4.01   Figures 1, 2, and 3 illustrate the coding of the answer-back drum. To remove the drum, proceed as follows: Lift the answer-back brace, by means of its extension, to deflect all contact wires and the detent away from the code drum. Hold the feed pawl away, and slip the code drum out. Do not overextend the feed pawl spring.

4.02   The code drum, prior to coding, is identical in either 5- or 8-level operation. As can be seen in Figure 1, three levels are not used when coding the drum for 5-level operation. The tines in these three levels may be left intact, since no contact wire springs sense these positions. When coding the drum for 8-level operation, all levels on the drum are used. See Figures 2 and 3.

4.03   The drum is coded in a counterclockwise direction (viewed from the numbered end), beginning with the start (ST) row 1. Code the drum by breaking and removing the tines as designated in Figures 1, 2, and 3. Either of the two following methods may be used for breaking off tines:

    (a)   Method 1: Use a screwdriver to remove each tine. Place the end of the screwdriver blade at the base of the adjacent tine. While applying pressure against the base of the adjacent tine, press the side of the blade against the top of the tine to be removed until it breaks. If both tines adjacent to the tine to be removed have been broken off, apply the end of the screwdriver to the stub of either one in breaking off the unwanted tine. This method of removing a tine is indicated in the illustration showing the tine rows in Figures 1, 2, and 3. In the illustration, pressure is being applied to the base of row 20 tine and against the top of an adjacent tine in row 19 to break it off.

    (b)   Method 2: Use a TP161686 tine tool or a pair of long-nosed pliers to remove each unwanted tine. Place the unwanted tine into slot of the tine tool, or grasp the unwanted tine firmly with the long-nosed pliers, and then, with the tool or the pliers held stationary, rotate the drum back and forth until the unwanted tine breaks off near its base. Use care not to damage adjacent tines.

4.04   The procedures described in the following paragraphs may be altered to suit a particular system or application. Where one character delay is required after the answer-back is tripped off and before the coded message begins, the character suppression tine should be removed in the (ST) start row of the code drum to provide the delay. If the first character suppression is not used, message coding starts on the rows shown coded with character suppression in Figures 1, 2, and 3.

4.05   Normally, a coded message should contain CR (carriage return) and LF (line feed) near the beginning and again near the end of the message. This assures that the transmitted message will appear at the beginning of a line on the receiving teletypewriter set, and that overprinting of the message will not occur. In 5-level operation, the coded message should also contain the "letters" code combination at the beginning of a message to place each teletypewriter set in the unshift position.
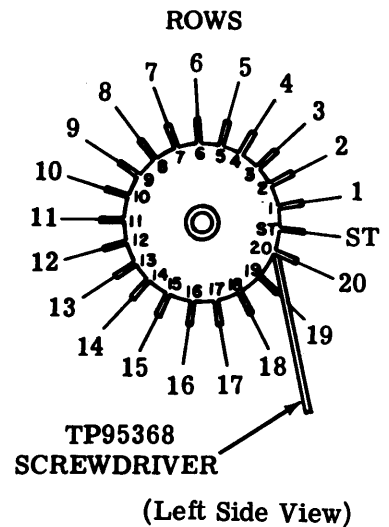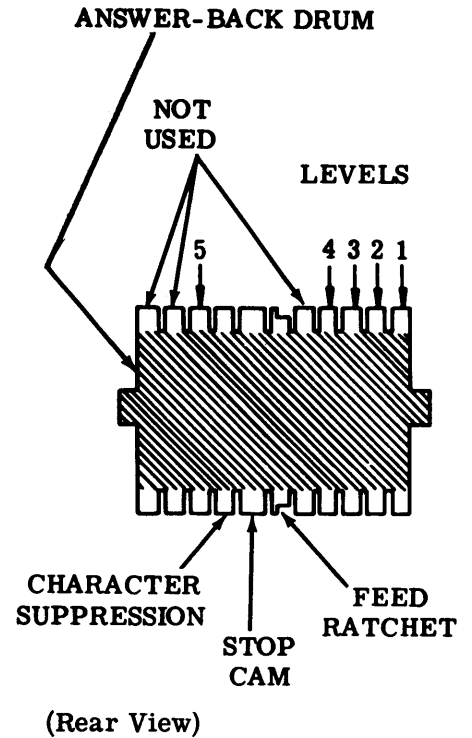
4.06   If the suppression tine is not removed in the ST row, the coded message may contain 21 characters for one-cycle operation, 10 characters for two-cycle operation, and 7 characters for three-cycle operation. Unused message coding rows should be coded using the suppression level.

4.07   If the suppression tine is removed, in the ST row, the message length is reduced by one character. The text of the message is further reduced by the number of functions which are peculiar to each system or application. With the suppression tine removed, a station identification message will contain no more than 20 characters, including spaces and nonprinting functions.

4.08   The length of an answer-back sequence can be varied either by removing the characters suppression level tine and/or the stop cam level tine. These two code drum levels, stop cam and character suppression, must always be coded in the same relationship to each other. (See Figures 1, 2, and 3).

4.09   A one-, two-, or three-cycle operation can be obtained by removing the appropriate tines from the stop cam level. Use two- or three-cycle operation for short messages and one-cycle for longer sequences. With the suppression tine removed, two-cycle operation permits 9 characters to be coded in each half of the drum. Three-cycle operation allows 6 characters to be coded in each third.

CODE LEVELS REMOVE TINES	LETTERS	FIGURES TYPICAL ARRANGEMENT	
1-2	A	—	—
1-4-5	B	5/8	?
2-3-4	C	WRU	:
1-4	D	$	+
1	E	3	3
1-3-4	F	1/4	$
2-4-5	G	&	&
3-5	H		#
2-3	I	8	8
1-2-4	J	'	BELL
1-2-3-4	K	1/2	(
2-5	L	3/4	)
3-4-5	M	.	.
3-4	N	7/8	,
4-5	O	9	9
2-3-5	P	0	0
1-2-3-5	Q	1	1
2-4	R	4	4
1-3	S	BELL	'
5	T	5	5
1-2-3	U	7	7
2-3-4-5	V	3/8	;
1-2-5	W	2	2
1-3-4-5	X	/	/
1-3-5	Y	6	6
1-5	Z	"	"
4	CARRIAGE RETURN		
2	LINE FEED		
1-2-3-4-5	LETTERS SHIFT		
1-2-4-5	FIGURES SHIFT		
3	SPACE		
NONE	BLANK		

ANSWER-BACK DRUM

NOT USED

LEVELS

CHARACTER SUPPRESSION

STOP CAM

FEED RATCHET

(Rear View)

REMOVE TINES AS SHOWN BELOW TO GET PROPER CYCLE		
CYCLES	CHARACTER SUPPRESSION	STOP CAM
1 Cycle	Row ST	Row 6
2 Cycle	Row ST Row 11	Row 6 Row 17
3 Cycle	Row ST Row 7 Row 14	Row 6 Row 13 Row 20

ROWS

TP95368 SCREWDRIVER

(Left Side View)

Note: Remove tine — marking.
Leave tine — spacing.

Figure 1 - Coding of Answer-Back Drum — 5-Level Teletypewriter Code
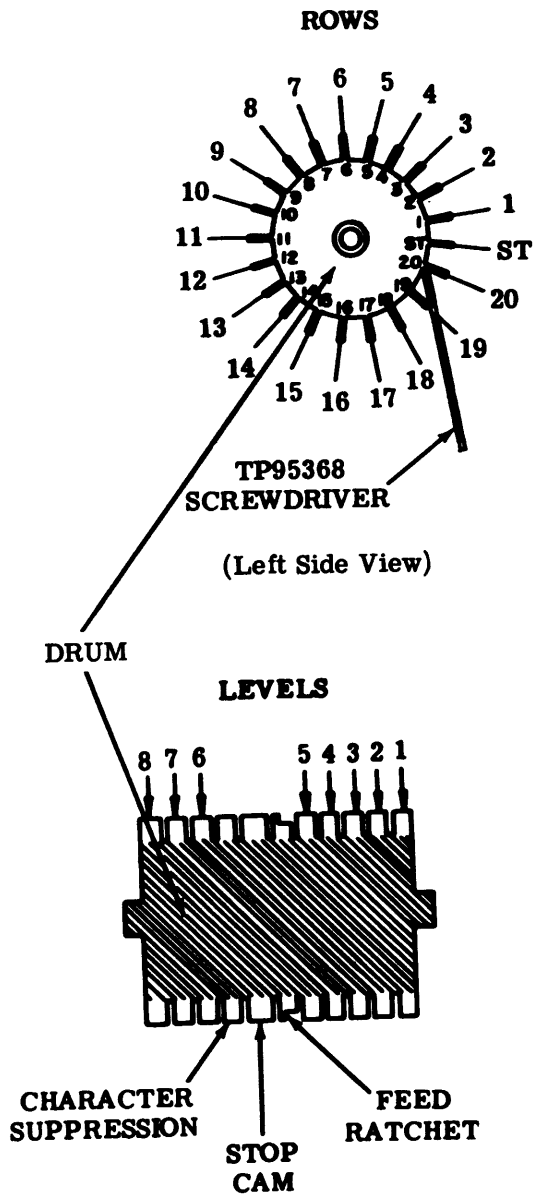
ROWS

TP95368
SCREWDRIVER

(Left Side View)

DRUM

LEVELS

CHARACTER
SUPPRESSION

STOP
CAM

FEED
RATCHET

(Rear View)

REMOVE TINES AS SHOWN BELOW TO GET PROPER CYCLE		
CYCLES	CHARACTER SUPPRESSION	STOP CAM
1 Cycle	Row ST	Row 6
2 Cycle	Row ST Row 11	Row 6 Row 17
3 Cycle	Row ST Row 7 Row 14	Row 6 Row 13 Row 20

Figure 2 - Answer-Back Drum

CODE LEVELS REMOVE TINES	ASCII CODE			CODE LEVELS REMOVE TINES	ASCII CODE		
	Bell System Usage	1967 Edition	1963 Edition		Bell System Usage	1967 Edition	1963 Edition
NONE		NUL	NULL	2-5-6-8		2	
1-8		SOH	SOM	1-2-5-6		3	
2-8		STX	EOA	3-5-6-8		4	
1-2		ETX	EOM	1-3-5-6		5	
3-8		EOT		2-3-5-6		6	
1-3	WRU	ENQ	WRU	1-2-3-5-6-8		7	
2-3		ACK	RU	4-5-6-8		8	
1-2-3-8	BELL	BEL	BELL	1-4-5-6		9	
4-8		BS	FEo	2-4-5-6		:	
1-4	TAB	HT	HT/SK	1-2-4-5-6-8		;	
2-4	LINE FEED	LF		3-4-5-6		<	
1-2-4-8		VT	VTAB	1-3-4-5-6-8		=	
3-4		FF		2-3-4-5-6-8		>	
1-3-4-8		CR		1-2-3-4-5-6		?	
2-3-4-8		SO		7-8		@	
1-2-3-4		SI		1-7		A	
5-8		DLE	DCo	2-7		B	
1-5	XON	DC1		1-2-7-8		C	
2-5	TAPE	DC2		3-7		D	
1-2-5-8	XOFF	DC3		1-3-7-8		E	
3-5	TAPE	DC4	DC4 (STOP)	2-3-7-8		F	
1-3-5-8		NAK	ERR	1-2-3-7		G	
2-3-5-8		SYN	SYNC	4-7		H	
1-2-3-5		ETB	LEM	1-4-7-8		I	
4-5		CAN	So	2-4-7-8		J	
1-4-5-8		EM	S₁	1-2-4-7		K	
2-4-5-8		SUB	S₂	3-4-7-8		L	
1-2-4-5		ESC	S₃	1-3-4-7		M	
3-4-5-8		FS	S₄	2-3-4-7		N	
1-3-4-5		GS	S₅	1-2-3-4-7-8		O	
2-3-4-5		RS	S₆	5-7		P	
1-2-3-4-5-8		US	S₇	1-5-7-8		Q	
6-8		SP	b	2-5-7-8		R	
1-6		!		1-2-5-7		S	
2-6		"		3-5-7-8		T	
1-2-6-8		#		1-3-5-7		U	
3-6		$		2-3-5-7		V	
1-3-6-8		%		1-2-3-5-7-8		W	
2-3-6-8		&		4-5-7-8		X	
1-2-3-6		'		1-4-5-7		Y	
4-6		(		2-4-5-7		Z	
1-4-6-8		)		1-2-4-5-7-8		[	
2-4-6-8		*		3-4-5-7		\	
1-2-4-6		+		1-3-4-5-7-8		]	
3-4-6-8		,		2-3-4-5-7-8		∧	↑
1-3-4-6		-		1-2-3-4-5-7		—	←
2-3-4-6		.		1-2-4-5-6-7		`	
1-2-3-4-6-8		/		3-4-5-6-7-8		{	ACK
5-6		0		1-3-4-5-6-7		}	ALT.MODE
1-5-6-8		1		2-3-4-5-6-7		~	ESC
				1-2-3-4-5-6-7-8	RUB OUT	DELETE	

Note 1: Remove tine — marking. Leave tine — spacing.

Note 2: Blank space indicates same as 1967 edition.

Note 3: Codes shown are for even parity operation; for nonparity, remove eighth level tine.

Figure 3 - Answer-Back Drum Coding

4.10 Do not remove the character suppression tine from the last row of each segment of the answer-back drum (row no. 20 for answer-back drums coded for one-cycle operation) on sets used in systems where a response to each answer-back activation signal must be obtained. The last row can be coded with any other character that is compatible with the particular system.

4.11 The number of rows available for message coding is shown below for 1-, 2-, or 3-cycle operation:

CYCLE OPERATION	TOTAL ROWS	AVAILABLE ROWS
1	21	20
2	10 (11)*	9 (10)*
3	7	6

*Alternately one, then the other.

4.12 The number of rows available for actual station identification is less than shown above, because each coded message should begin and end with CARRIAGE RETURN and LINE FEED (this may be altered in specific applications). This assures that the transmitted message will appear at the beginning of a line of the receiving teletypewriter set and eliminates overprinting.

Note: Another use which can be made of the character suppression level tines is the elimination of coding errors. If a coding error is made, or for some reason it is necessary to suppress (erase) characters from the code drum, remove the character suppression tine from the rows affected.

CODING EXAMPLES

4.13 In switched network service applications, the station identification for 1-cycle operation may not exceed 14 characters, including spaces. The answer-back drum should be coded as follows:

ABBREVIATION	KEY TO ABBREVIATION
ACK	Acknowledge
CR	Carriage Return
LF	Line Feed
RO	Rub Out
SP	Space
SUP	Character Suppression

(a) Example 1:

SUP CR LF RO

TELETYPE SP NILES CR LF ACK

Company   City

Station Identification
(Maximum — 14 characters)

Note: In this system, the ACK character code combination must be the final significant character code combination in the coded answer-back message.

(b) Example 2:

SUP CR LF RO

ERIE SP BOST CR LF ACK SUP SUP SUP SUP SUP

Company   City

Station Identification
(Less than maximum
number of characters)

Note: If the station identification is less than the maximum of 14 characters in length, then the remaining rows on the answer-back drum must be coded with the character suppression code according to Example 2 above.

4.14 To replace the answer-back drum, place the TP180854 brace in its detented open position, and lift feed pawl (do not overextend its spring). Replace drum with its shaft firmly seated in the contact block slots. Release feed pawl and TP180854 brace. Rotate answer-back drum to assure proper seating of its associated parts. Check that the contact wires are located in their proper slots.