

37 ANSWER-BACK UNIT (YAB802)

DESCRIPTION AND PRINCIPLES OF OPERATION

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1. GENERAL

1.01 This section provides the description and principles of operation for the late design 37 answer-back unit (Figure 1). For information concerning adjustments and lubrication, refer to Sections 574-325-703 and 574-325-704.

1.02 The function of the answer-back unit is to generate a pre-coded message of 20 characters or less, usually a station identification. Each character can include up to 8 levels of binary information and can accommodate applications using 5-, 6-, 7-, or 8-level codes.

1.03 The answer-back unit provides a code drum for encoding the desired character sequence. The code drum has frangible tines which can be easily removed for establishing spacing bits in required code level positions.

Depending on the length of an answer-back message, the answer-back unit can generate one, two, or three identical messages per revolution of the code drum. The drum coding information is contained in answer-back adjustments Section 574-325-703 or the appropriate set installation literature.

1.04 The answer-back unit is designed to work with an electrical service unit that contains a transmitting distributor and associated send control circuits. For information concerning the circuit description on the answer-back circuit card and the operation with the electrical service unit, refer to the appropriate description and operation literature for the 37 electrical service unit and the wiring diagram package for the appropriate set.

2. DESCRIPTION

2.01 The answer-back unit is an electro-mechanical device with an associated control circuit card. The major components are

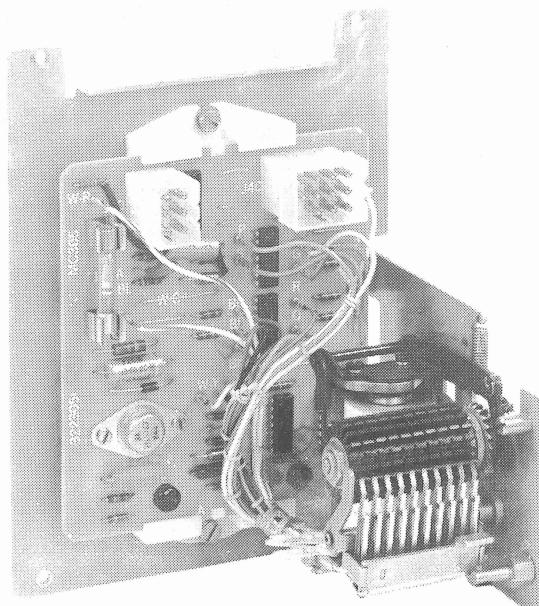


Figure 1 - 37 Answer-Back Unit

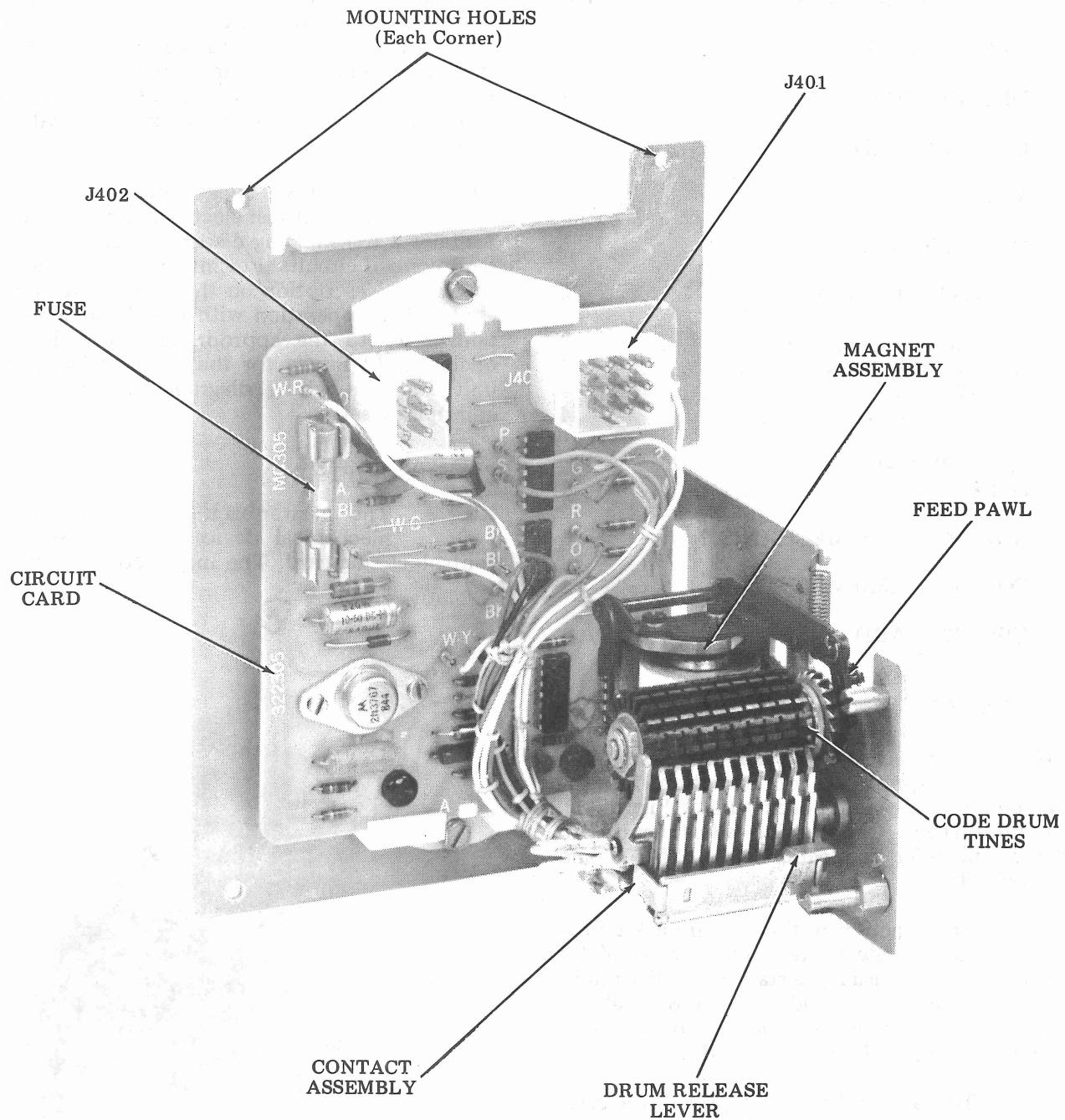


Figure 2 - Answer-Back Unit

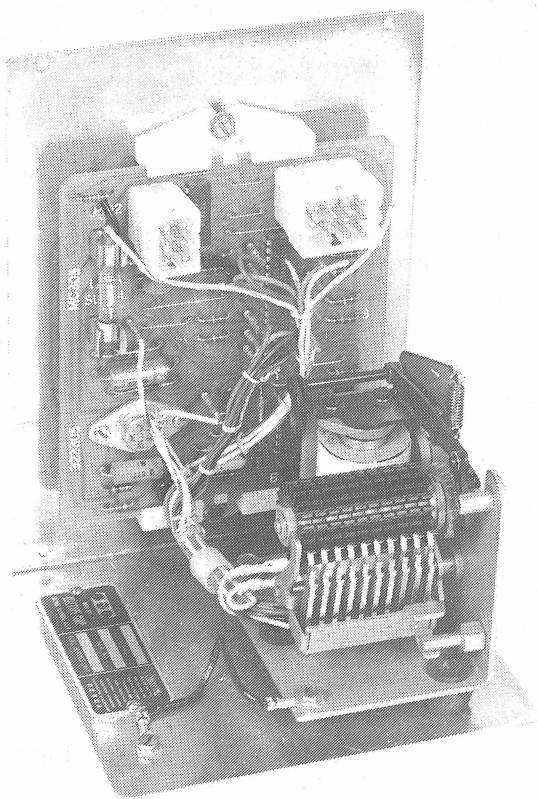


Figure 3 - Answer-Back Unit With Mounting Bracket Variation

shown in Figure 2. The answer-back unit with a mounting bracket variation is shown in Figure 3.

#### CIRCUIT CARD

2.02 The circuit card for answer-back unit has a parallel signal output. This circuit card provides control for the mechanical answer-back and contains data output gates, control logic, and a driver for the stepping magnet. The distributor in the electrical service unit converts the parallel signal to serial form.

2.03 The character rate or words per minute speed is established by the on-line distributor through the send control circuit. The pulse from the send control circuit triggers the driver circuit which causes the stepping magnet to advance the code drum one position for each pulse received.

2.04 The baud rate (bits per second) and the start signals associated with serial transmission are established by the distributor. The send control circuit coordinates the serial transmission for a continuous sequence of characters.

#### MECHANICAL ASSEMBLY

2.05 The mechanical assembly consists of a stepping magnet, feed mechanism, contact assembly, and code drum. Associated brackets, springs and wires comprise the remaining elements of the assembly. A drum release lever (Figure 2) is provided on the contact assembly to facilitate removal of the code drum. The lever, when depressed, holds the contact swingers and drum retaining extension away from the code drum, allowing its removal.

#### CODE DRUM

2.06 The answer-back drum is coded by removing a tine for a spacing signal and leaving a tine for a marking signal. In addition to the eight code levels, the code drum (Figure 4) contains two control levels: character suppression and off-normal (STOP). The character suppression tines are left in for unused rows in each message cycle. The off-normal tines control the number of message cycles desired and the row the drum stops in. When a tine is left on the drum, the off-normal contacts close, removing the Message Available signal and stopping the message cycle.

#### TECHNICAL DATA

##### A. Physical Characteristics

Weight	.....	2-1/2 pounds
Height	.....	6-5/8 inches
Width	.....	5 inches
Depth	.....	4-1/2 inches

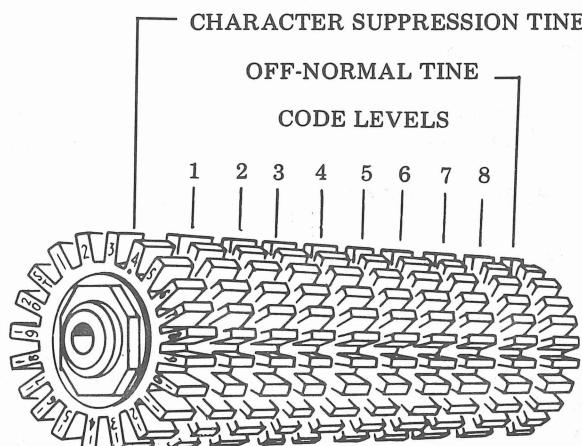


Figure 4 - Code Drum

## B. Message Characteristics

Signal output . . . . . parallel

## Character Rate

Character per second . . . . . 0 - 15  
 Words per minute . . . . . 0 - 150  
 Maximum bits per character . . . . . 8  
 (will accommodate 5-, 6-, 7-, or 8-level codes)

## C. Circuits

## Stepping Magnet

Voltage . . . . . +12 and -12 volts dc  
 Maximum current . . . . . 1.2 amperes

## Circuit Card

Voltage . . . . . +6 volts dc  
 Size . . . . . 4 inches by 4-1/2 inches

## Data Outputs

Mark . . . . . high (+3.5 to +6.6 volts dc)  
 Space . . . . . low (0 to +0.5 volts dc)  
 Suppress . . . . . low (0 to +0.5 volts dc)

## Code Contacts

Type . . . . . 90% gold contact buttons

## D. Environment

## Ambient Temperature

Minimum . . . . . 40°F  
 Maximum . . . . . 110°F

## Relative Humidity

Minimum . . . . . 0%  
 Maximum . . . . . 95%

## 3. PRINCIPLES OF OPERATION

## ANSWER-BACK MECHANISM

3.01 The operation of the answer-back mechanism is started when the stepping magnet receives a pulse from the driver circuit. The current rise energizes the stepping magnet which attracts the armature. The armature and attached feed bail (Figure 5), when pivoted, index the feed pawl one tooth on the ratchet wheel. Upon electrical release of the stepping magnet, the feed bail spring pulls the feed bail upward.

The feed pawl rotates the ratchet one step, advancing the code drum out of the home position. The following sequence then occurs:

(1) The code reading contacts of the contact assembly sense the first character to be transmitted.

(2) The off-normal contact swinger moves into a recess (tine removed) in the code drum, opening the off-normal contact.

3.02 The off-normal contact, when opened, maintains feed pulses from the driver circuit to the stepping magnet. The operational sequence continues until the off-normal contact closes (home position).

3.03 In the home position, the off-normal contact rises on a tine in the code drum. This action closes the contacts on the off-normal contact swinger and prevents further operation of the answer-back unit.

## CONTACT ASSEMBLY

3.04 The contact assembly (Figure 5) requires that the code drum be stepped off the home position to send one character per row on the drum. The code drum provides the removable tines to be sensed by the contact assembly.

3.05 The operation of the contact swingers is controlled by each row on the drum and provides parallel signal output. For a spacing bit, the tine is removed and the contact swinger falls into the depression left by the removed tine, opening the contact. When the tine is left in, for a marking bit, the swinger rides on the tine, holding the contacts closed.

3.06 All unused character positions except for the first row (home position) are suppressed by leaving in the suppression level tine (Figure 4) in that row.

3.07 The off-normal or STOP contact position (Figure 4) establishes the home position of the answer-back cycle. The answer-back drum will stop in any row that has the off-normal tine left in.

3.08 When open, the off-normal contacts block subsequent start signals and place control of the stepping magnet under the Present Character signals from the send control card. The line distributor card prevents an additional transmitting device from sending during the answer-back cycle.

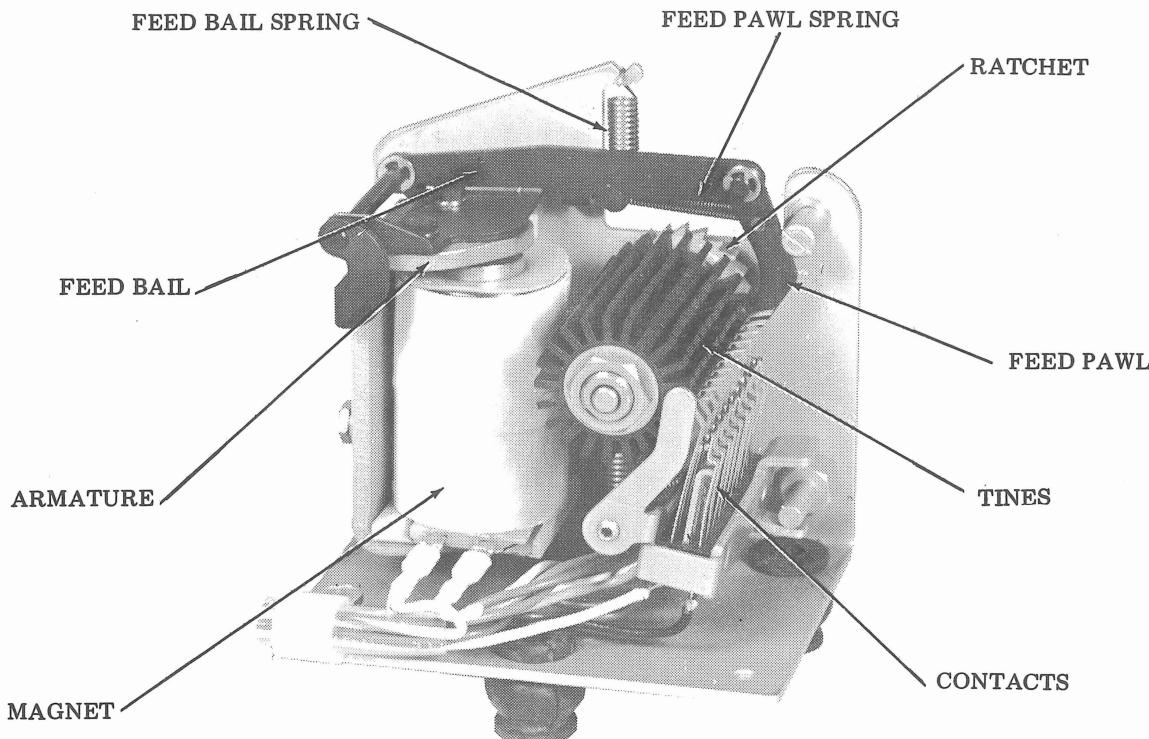


Figure 5 - Feed Mechanism (on Mounting Bracket Variation)

#### CIRCUIT CARD

3.09 The electronic circuit for the answer-back unit contains the logic necessary for the data outputs, and the logic required to drive the stepping magnet. A START command initiates answer-back operation through a filter network and NAND gate. This circuit combination provides a momentary clock pulse to drive a flip-flop for each START command. The flip-flop sets turn on the magnet drive circuitry. After a timed interval, a pulse is issued to clear the drive flip-flop. The drive transistors turn off. The answer-back magnet releases the armature which pulls the answer-back code drum to the first position.

3.10 At this time, the normally closed off-normal contacts open. A Message Available indication is provided, disabling the input of the flip-flop. The START command now has no effect on the circuit, and the control of the answer-back unit is now under the direction of the Present Character input.

3.11 The Present Character command from the terminal logic initiates two simultaneous functions. It enables the data output gates to present the data bits read from the code level contacts. It also sets the drive flip-flop, repeating the cycle to advance the code drum another step. The Present Character command is one bit in length, and must be removed before the armature is fully attracted and the code drum is moved. Sufficient time to read the character is allowed before the drum is advanced.

3.12 Reading and advancing the code drum occurs with each Present Character command. When the drum advances to the home position, the off-normal contact closes. This causes removal of the Message Available indication and primes the synchronous input of the drive flip-flop. The terminal logic does not issue further Present Character commands when Message Available has been removed. The answer-back unit is now in an idle state, and may be started again by a START command.