

SERIES 200

TYPE 281-1A COMMUNICATION CONTROL AND TYPE 285-1A COMMUNICATION ADAPTER

SUBJECT:

Equipment Specifications for the Type 281-1A Single-Channel Communication Control and the Type 285-1A Communication Adapter for use with Western Union Telex Equipment.

**SPECIAL
INSTRUCTIONS:**

This bulletin supersedes the Honeywell Customer Information Bulletin Number 200-35, dated November 3, 1964. References used in the text are the bulletin Type 286-1, -2 and -3 Multi-Channel Communication Controls, Order No. 160, the Honeywell Series 200 Models 200/1200/2200 Programmers' Reference Manual, Order No. 139, and the Honeywell Series 200 Model 120 Programmers' Reference Manual, Order No. 141.

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EQUIPMENT SPECIFICATIONS FOR THE TYPE 281-1A COMMUNICATION CONTROL AND THE TYPE 285-1A COMMUNICATION ADAPTER

I. GENERAL DESCRIPTION

The Type 281-1A Single-Channel Communication Control and Type 285-1A Communication Adapter provide the interconnection of a Series 200 central processor with a Western Union Telex subscriber teleprinter station in the continental United States and Canada (see Section IV, A), also with any international Telex subscriber station.

Transmission service is provided by connection to a Western Union automatic Telex exchange via a Western Union Telex subscriber station equipped with a Teletype Model 28 or 32 Keyboard Send-Receive (KSR) or Automatic Send-Receive (ASR) Teleprinter and any one of a series of Western Union computer interface adapters.

Section V discusses the available Western Union computer interface line adapters and the control over Telex call origination, call answer, data interchange, and call disconnect provided via the Type 281-1A or Type 285-1A to the Series 200 central processor.

Some Western Union computer interface line adapters permit computer Telex call origination (automatic dialing) and/or call disconnect initiation by the central processor.

The Types 281-1A and 285-1A are compatible with all standard Series 200 central processors except the Type 121 — this central processor must be equipped with Feature 1015 or Feature 1016 (see the Model 120 Programmers' Reference Manual).

As illustrated in Figure 1, page 2, the Type 281-1A connects one Western Union Telex line to the central processor. The Type 285-1A Communication Adapter is used in conjunction with a Type 286 Multi-Channel Communication Control to connect one Telex line when a maximum of 63 communication lines are to be linked to a Series 200 central processor.

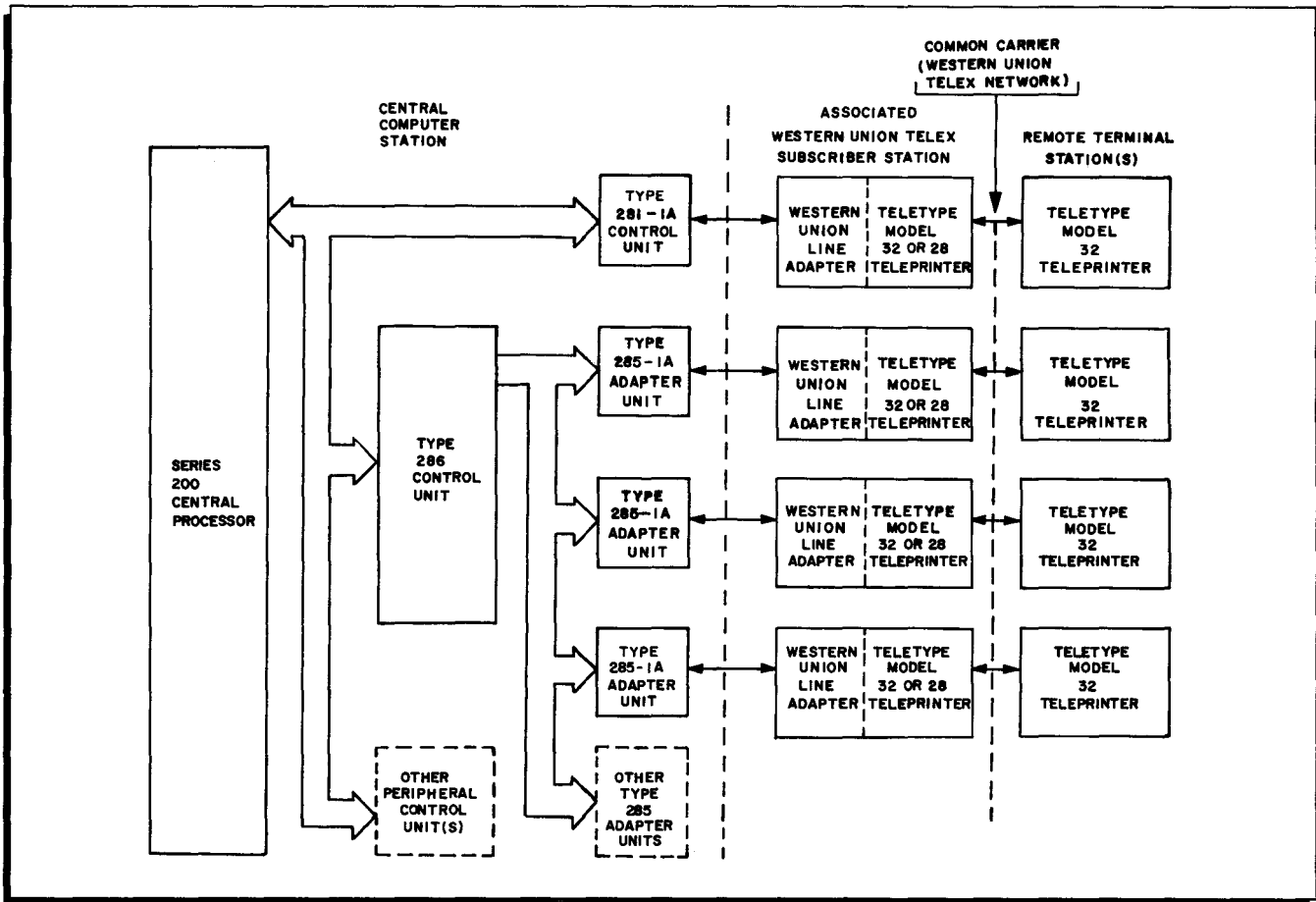


Figure 1. Applications of Types 281-1A and 285-1A

Transmission on Western Union Telex facilities is characterized by start-stop synchronous serial transmission of CCITT (Comite Consultative Internationale Telegraphique et Telephonique) Alphabet Number 2, five-level code in half-duplex (two-way, non-simultaneous) mode.

Here one character comprises five code bits plus one start bit and 1.5 stop bits. The duration of the complete character is 150 milliseconds. The maximum line speed is 6.6 characters per second, at 50 baud (the baud rate being the reciprocal of the information bit duration expressed in seconds).

Equipment at the remote Telex station may include any teleprinter equipment normally available in Western Union Telex subscriber station service, such as Teletype Model 28 and Model 32 KSR and ASR Teleprinters.

The standard Series 200 logic drawer contains one Type 281-1A Communication Control or fifteen Type 285-1A Communication Adapters.

II. INTERFACE WITH THE SERIES 200 PERIPHERAL BUS AND WITH THE TYPE 286

A. Type 281-1A Interface with the Series 200 Central Processor

Standard peripheral interface logic for non-simultaneous input and output connects the communication control to the standard Series 200 peripheral bus.

B. Type 285-1A Interface with the Type 286 Multi-Channel Communication Control

The Type 285-1A interface with the Type 286 is described in Section IV of the Honeywell bulletin Type 286-1, -2 and -3 Multi-Channel Communication Controls.

III. INTERFACE WITH THE ASSOCIATED WESTERN UNION TELEX SUBSCRIBER STATION

In the Type 281/285-1A communication systems, the Western Union Telex access service termination is a Western Union Telex subscriber station equipped with a Western Union computer interface adapter, with a KSR teleprinter — normally a Teletype Model 32 KSR Teleprinter — and a Telex call control unit for manual call originate/disconnect operation.

A. Computer Interface Adapter Configurations

The Western Union computer interface adapter may consist of any of the following three configurations, depending upon the degree of control desired over Telex call origination and/or disconnect operation:

1. The Western Union Type 11671 Computer Interface Adapter;
2. The Western Union "Inquiry" Interface Panels 11767 or 11905 together with Western Union Computer Input/Output Set 11903A;
3. The Western Union "Send" Panel 11768A, "Receive" Panel 11767 and Computer Input/Output Set 11903A.

As indicated above, the degree of control exercised over the line by the central processor varies with these line adapters — it is discussed in greater detail in subsequent Sections V and VI.

IV. CHARACTERISTICS AND CODES OF REMOTE TERMINAL EQUIPMENT

A. Remote Terminal Equipment

Any Telex station, whether national or international, interconnecting with the Western Union Telex network is an appropriate remote terminal for this system. In the United States, the remote terminal is usually a Teletype Model 28 or 32 Keyboard "Send-Receive" (KSR) or Automatic "Send-Receive" (ASR) Teleprinter.

Though the KSR version has a receiving printer and a sending keyboard, it does not possess paper-tape transmitting or recording capabilities. The ASR version, on the other hand, not only possesses the printer and keyboard but also paper-tape sending and punching capabilities. The paper tape may be prepared locally, and often the Automatic "Send-Receive" Teleprinter has auxiliary equipment which enables it to receive and perforate tape from the line with a "reperforator."

"Receive Only" (RO) units which print only incoming information are not found on Telex lines except as auxiliaries to the keyboard or teleprinter remote terminals.

B. Codes

The code used by Western Union Telex in the United States constitutes a slight variation on CCITT Alphabet Number 2. The variation involves the FIGS shift on letters F, G and H (these do not print when shifted on the international version) and a difference in the FIGS shift of V and Z (see Figure 2). This code and its binary equivalents are illustrated in Table I.

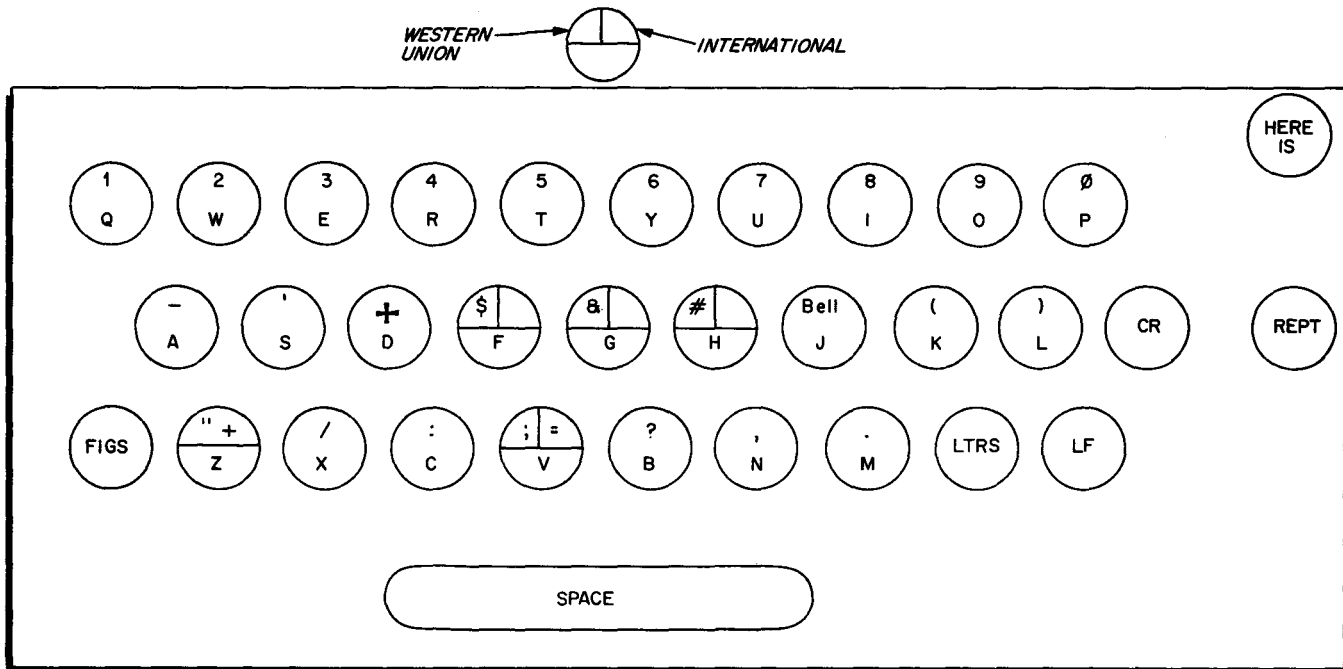


Figure 2. Model 32 Keyboard for Telex

Table I. Binary Conversion of CCITT Alphabet #2

LTRS KEY	FIGS KEY	5-BIT CODE (AS SEEN ON LINE -- EXCLUDING START AND STOP)					OCTAL CHARACTER IN MEMORY
		BITS					
		1	2	3	4	5	
A	-	1	1	0	0	0	03
B	?	1	0	0	1	1	31
C	:	0	1	1	1	0	16
D	+ (WRU)	1	0	0	1	0	11
E	3	1	0	0	0	0	01
F	\$	1	0	1	1	0	15
G	&	0	1	0	1	1	32
H	#	0	0	1	0	1	24

Table I (cont). Binary Conversion of CCITT Alphabet #2

LTRS KEY	FIGS KEY	5-BIT CODE (AS SEEN ON LINE- EXCLUDING START AND STOP)					OCTAL CHARACTER IN MEMORY
		BITS					
		1	2	3	4	5	
I	8	0	1	1	0	0	06
J	BELL	1	1	0	1	0	13
K	(1	1	1	1	0	17
L)	0	1	0	0	1	22
M	.	0	0	1	1	1	34
N	, (Comma)	0	0	1	1	0	14
O	9	0	0	0	1	1	30
P	0	0	1	1	0	1	26
Q	1	1	1	1	0	1	27
R	4	0	1	0	1	0	12
S	' (Apostrophe)	1	0	1	0	0	05
T	5	0	0	0	0	1	20
U	7	1	1	1	0	0	07
V	;	0	1	1	1	1	36
W	2	1	1	0	0	1	23
X	/	1	0	1	1	1	35
Y	6	1	0	1	0	1	25
Z	"	1	0	0	0	1	21
BLANK		0	0	0	0	0	00
LTRS		1	1	1	1	1	37
FIGS		1	1	0	1	1	33
SPACE		0	0	1	0	0	04
CARRIAGE RETURN		0	0	0	1	0	10
LINE FEED		0	1	0	0	0	02

NOTE

For further clarification of relationship between character on line and in memory, see Section VI, B, 2.

For the character as it appears on the line, see Figure 2.

The data signal at the control interface with the associated Telex station computer interface adapter is illustrated in Figure 3.

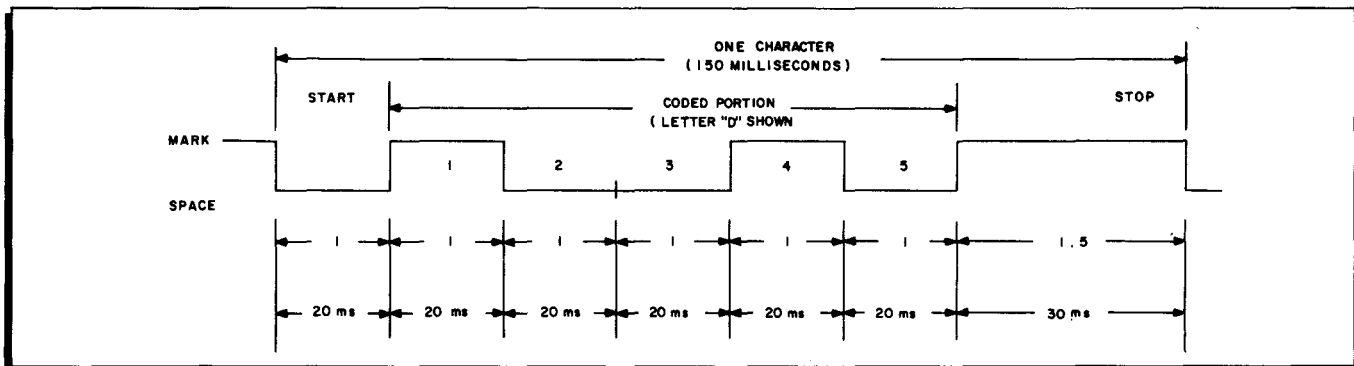


Figure 3. Data Signal at Communication Control/Teletype Model 32 Interface

V. OPERATIONAL CONTROLS AND PROCEDURES

A. Control

The degree of control exercised over the line by the central processor varies with the type of Western Union computer interface adapter utilized at the associated Telex station. Below is a brief description of the three available computer interface line adapter configurations, together with the degree of control afforded by each. Applicable programming requirements for each type are discussed in Section VI.

1. Western Union Type 11671 Line Adapter

The simplest Western Union computer interface adapter is the Type 11671. A switch on the Model 28 or 32 Teleprinter enables or disables the adapter, making the teleprinter the main communication unit and the Type 281-1A or Type 285-1A the subsidiary or adjunctive input/output device. Call initiation, dial information signalling, and response to call-busy signalling are executed or monitored exclusively by the manually operated control facilities of the associated Telex station.

2. Western Union Type 11905 Inquiry Interface Panel and Associated 11903A Computer Input/Output Set

In this adapter configuration, the manually operated switch either connects or disconnects the teleprinter and the communication line. The Type 281-1A Communication Control or Type 285-1A Communication Adapter is the main means of communication, although calls are initiated by the associated Western Union Telex station. This Western Union configuration permits the central processor — through the communication control or adapter unit — to respond to incoming calls and to terminate calls. Appropriate programming is discussed in Section VI, A, 5 and VI, C.

3. Western Union "Send" Panel 11768 and "Receive" Panel 11767, with One Associated 11903A Computer Input/Output Set

Here the central processor assumes full control of the line and is in command of originating or receiving a call. A Western Union Model 32 "Send-Receive" teleprinter is still available for alternate call initiation and/or providing a copy of the call for test and maintenance purposes.

Proper procedure when a central processor is to initiate, answer, or terminate a call is described in Section VI, B, 4 and Section VI, C, respectively.

NOTE

Although the central processor is given various degrees of control, the local teleprinter may be used as the data station at anytime.

B. Operating Procedures

Procedures described in the following paragraphs are applicable when a Western Union Teletype unit is the local controlling unit. Call initiations, responses, or disconnections by program are discussed in appropriate paragraphs of Section VI.

1. Call Initiation with Teletype Unit

- a. On the Teletype control panel, depress START until DIAL lights, indicating that Telex exchange service is available.

b. Dial the number of the called station.

- (1) If the call is completed, CONN (Connect) lights, DIAL is extinguished and the motors in both the calling and called stations are activated.
- (2) If the called station is busy, CONN lights momentarily, but both the motor and the lamp are deactivated as the set returns to the Idle condition.

2. Initial Exchange

An exchange of calls is usually initiated after connection is established to determine the identity of a remote station. Depressing FIGS on the Teletype control panel, then the D key, sends the "who-are-you?" (WRU) signal to the remote terminal. Depressing HERE IS on the teleprinter control panel identifies the local station to the remote station by printing the local station identification on both teleprinters.

3. Data Transfer

Data is sent from the central processor by way of the communication control, or from the teleprinter keyboard, but it is not sent from both simultaneously.

4. Termination

To terminate a call, STOP is depressed and held until the CONN light is extinguished. A call can be terminated by the sender or the receiver.

VI. PROGRAMMING REFERENCE DATA

A. General Description

The Type 281-1A Communication Control handles data on either a single-character or character block (message) basis, whereas the Type 285-1A Communication Adapter operates in conjunction with a Type 286 Multi-Channel Communication Control and only in the single-character mode of transmission. Therefore some basic programming differences occur. Unless otherwise specified, the following paragraphs describe programming for the Type 281-1A. Much of the programming information for the Type 285-1A is contained in Section VI of the bulletin Type 286-1, -2 and -3 Multi-Channel Communication Controls.

B. Type 281-1A Programming

Whether operating on a single-character or block basis, the Type 281-1A Communication Control requires that a record mark be set in the data storage area of main memory to terminate data transfer and to release the engaged read/write channel. The communication control also releases the input read/write channel upon "time-out," that is, when no activity has occurred over the communication line for 30 seconds.

NOTE

Though the following discussion of the Type 281-1A is based on the use of central processor interrupt capability, communication control operation does not require such capability. The Type 281-1A may be tested frequently by the program, thus ensuring that a character is trans-

ferred to the shift register or from it during the minimum stop-bit time of 30 milliseconds.

The program interrupt capability is standard for all Series 200 central processors except the Type 201, where Feature 012 — Program Interrupt — provides this capability (see Models 200/1200/2200 Programmers' Reference Manual).

1. Initiating Type 281-1A Operation

- a. The Type 281-1A Communication Control begins operating when INITIALIZE is depressed on the central processor control panel.
- b. In programming initial Type 281-1A operation, all peripheral units are cycled and made ready, the required address is entered in the interrupt register, and a Peripheral Control and Branch (PCB) instruction is issued to the Type 281-1A, setting the Allow function for interrupts.
 - (1) If the receiving Type 281-1A — initially activated — has not yet fully assembled a character when Allow is set, it assembles the character being received, sets the Input Frame Demand, and interrupts the central processor.
 - (2) If one or more characters have been completely assembled between the start of operation and the setting of Allow, Input Frame Demand and Interrupt are set immediately; they may or may not overwrite, depending on the number of characters assembled.
 - (3) If the communication control is not receiving, it interrupts within one-half of a character time, also setting Output Frame Demand.

If either an Output or Input Frame Demand condition is set, an interrupt occurs within one character time. When Input Frame Demand is set — as determined by a PCB test — a PDT instruction is issued to bring in the data. When the Output Frame Demand function is set — as it is during "initialization" of the program — the program issues a PDT instruction to begin transmission of data. The program may also issue a PCB instruction to reset the present interrupt, then a Resume Normal Mode (RNM) instruction. In order to resume normal mode operation, either a PDT instruction or a PCB instruction must be issued to reset Interrupt.

2. Call Initiation

Automatic central processor dialing is possible if the local teletype unit is equipped with the Western Union "Send" Interface Panel 11768, "Receive" Interface Panel 11767, and an associated 11093A Computer Input/Output Set (Section V, A, 3). When all "initialization" procedures (Section VI, B, 1) are completed, the programming procedures for dialing are as follows:

- a. Issue a PCB instruction to check for an Output Frame Demand condition.
- b. Issue a "Transmit" PDT instruction referring to a single-character field containing FIGS (octal 33), followed by a Resume Normal Mode instruction.

- c. The communication control transmits this character, sets the Output Frame Demand function, and interrupts the central processor.
 - d. Issue a PCB instruction to check for an Output Frame Demand.
 - e. Issue a "Transmit" PDT instruction, referring to a single-character field which contains the first digit of the number, followed by a Resume Normal Mode instruction.
 - f. This first digit is transferred to the Western Union interface and the Interrupt and Output Frame Demand functions are set.
 - g. Issue a PCB instruction to test for an Output Frame Demand.
 - h. The interrupt generated in step f should be ignored because the mode is "receive only" during dialing. This interrupt must be reset later by a PCB instruction.
 - i. The Western Union interface now requests connection to the exchange register. When the connection is established, the first digit is transmitted — usually within ten seconds.
 - j. Action of the Western Union interface, upon completion of first-digit transmission, is described in Section V. By program, the Type 281-1A sends the central processor a LTRS character (octal 37) or a V character within ten seconds. This character sets Input Frame Demand and Interrupt.
 - k. Issue a PCB instruction to check for the Input Frame Demand condition.
 - l. Issue an "Input" PDT instruction to bring in the character.
 - m. Check the received character to determine whether it is a LTRS or a V character.
 - n. After one-half of a character time, Output Frame Demand and Interrupt are set.
 - o. Issue a PCB instruction to check for an Output Frame Demand condition.
 - p. Issue a "Transmit" PDT instruction to obtain the second digit, as in step e., above. This instruction must be issued within 400 milliseconds of the time the input interrupt occurred in step j., above.
- Repeat steps e through p until all digits are sent.
- q. When all digits are sent, issue a PCB instruction to check for Output Frame Demand.
 - r. Issue a "Transmit" PDT instruction sending out an upper case Z in CCITT code, as in step e, above.
 - s. Steps f through o, above, are now repeated. The only variation is that the LTRS or V character no longer signifies a "present next digit" instruction — it is simply a signal to transmit.
 - t. Issue a PDT instruction to start transmission.

NOTE

The frame demand must be tested to discover whether it is an Input or Output Frame Demand before a proper

PDT instruction can be issued. Its state — in a real-time environment — is uncertain. If the direction of data transfer in the PDT instruction opposes the direction of data transfer requested by the frame demand, the results are unspecified. This is true of all transactions occurring between the central processor and the Type 281-1A Communication Control.

3. Incompleted Calls

If — once initiated — the call is not completed, one of three conditions exists: The called unit is busy, no connection is made, or no response whatsoever is made to the dialing.

a. Busy or No Connection

The "busy" and "no connection" conditions produce identical results. When the call is initiated, the central processor receives a "spacing" signal for 800 milliseconds. This is equivalent to five "blank" characters (five octal zeros). The program recognizes this sequence of five blank characters as a busy or no connection condition; it does not transmit the next digit. After a suitable time, the line returns to a normal idle state. The program can redial after an interval of time.

b. No Response

Possibly, because of a malfunction, there is no response from the line within ten seconds. To recognize this condition, the program must "time-out." This can be accomplished by (1) programming, or (2) use of the Type 285-T or Type 213-3 Interval Timer.

4. Response to a Call

When a FIGS, D sequence is received from the calling terminal, the local Western Union Telex station responds in either of the following two ways, depending upon the user's preference at the time of installation.

- a. It automatically returns a "Here Is" message and repeats the sequence for the control unit.
- b. Telex suppresses transmission of "Here Is," transmitting instead an artificial LTRS character or V character to the communication control.

In either case, upon receipt of the LTRS character, the Type 281-1A becomes busy, as in any normal receive situation. When it has assembled one full character, it sets the Input Frame Demand and Interrupt functions. The character is transmitted to the central processor and tested. If the program recognizes the LTRS or V character, it returns a "Here Is" message when it is able to transmit. The "Here Is" message has the following sequence:

- (1) Space
- (2) LTRS
- (3) Carriage Return
- (4) Line Feed

- (5) Identification
- (6) Carriage Return
- (7) Line Feed

If the program does not recognize the LTRS or V character, no response is needed.

In either case, if the calling station does not identify itself within a reasonable time, the program may want to issue a FIGS, D sequence.

5. Line Contention

A call may be coming in at approximately the same time the program is dialing. In this event, any one of the following conditions may occur:

- a. If connection already has been established with the exchange, the dialing operation takes precedence. The Western Union interface returns a busy signal to the calling party.
- b. If the first character of the call is being received by the Type 281-1A, initiation of the dial is prohibited.
- c. If the reception of the character and the dialing of the first digit occur within one-half of a character time of each other, the results are unspecified.

6. Normal Receive

Upon reception of the first character's start bit from the line, the Type 281-1A becomes busy. The first full character received by the communication control causes a program interrupt. In response to this interrupt, the program issues a Peripheral Data Transfer (PDT) instruction to bring that character and succeeding characters into the assigned area in main memory.

Reception continues until a record mark in memory is encountered; then the associated read/write channel is released. If no further characters are received for one-half of a character time after the record mark has been encountered, the Type 281-1A reverts to the not-busy state and — if Allow is set — an interrupt requesting output occurs. This interrupt is identified by a positive response to the "Output Request" PCB instruction; it may be used to indicate the end of a received message.

If a received message requires less than the assigned memory area, the record mark terminating the data transfer is not encountered. In this case a timer in the Type 281-1A is activated. After 30 seconds the assigned read/write channel is released, Device Error is set, and the Type 281-1A reverts to not-busy. An interrupt requesting output then occurs.

7. Normal Transmit

Data is transferred from the assigned memory location until a record mark is encountered; then the read/write channel is released. Now an interrupt occurs after the last character is transmitted to the line. Next, a second PDT instruction is issued to continue data transmission or — if transmission is complete — a "Reset Interrupt" PCB instruction is sent acknowledging receipt of the interrupt and indicating that no more data is to be sent. An interrupt next occurs if data is received. A "Reset Allow" PCB instruction may be given to prevent any further interrupt from the Type 281-1A.

The remote terminal teleprinter types 70 to 75 characters per line; the program must limit the number of characters accordingly. At the end of each line CARRIAGE RETURN, LINE FEED and LTRS (or FIGS, if the next line begins with figures) must be activated in that order before the next sequence of 70 characters is begun.

A number of LTRS characters also may be interspersed in the message, since they are used to aid any necessary resynchronization of the communication control at the remote terminal.

8. Device Error

Device Error is indicated when any one of these three conditions occurs:

- a. Though a "Receive" PDT instruction is active, the communication control has sensed no activity on the line for 30 seconds. This indicates that the received message is less than the assigned memory area. Consequently, no record mark has been sensed in memory and the read/write channel has not been released.

This condition is indicated by the Output Frame Demand being set and by the read/write channel current location counter referring to the middle of the assigned area of memory.

- b. An error occurs in the stop bit of data. This happens if both terminals attempt to transmit simultaneously or if the line is open during transmission of the character.
- c. The program is too slow in taking a character, thereby causing an overwrite.

C. Record Marks and Character Location in Main Memory

1. Required Record Marks

- a. Type 281-1A Single-Character Method of Transmission

When data is being transmitted by the single-character method, a record mark is placed in memory location A+1 to terminate a character. When data is being received, character termination is indicated by a record mark in memory location A. Upon termination of a character, the read/write channel current location counter contains the address of A+1 after transmission or reception.

- b. Type 281-1A Block Method of Transmission

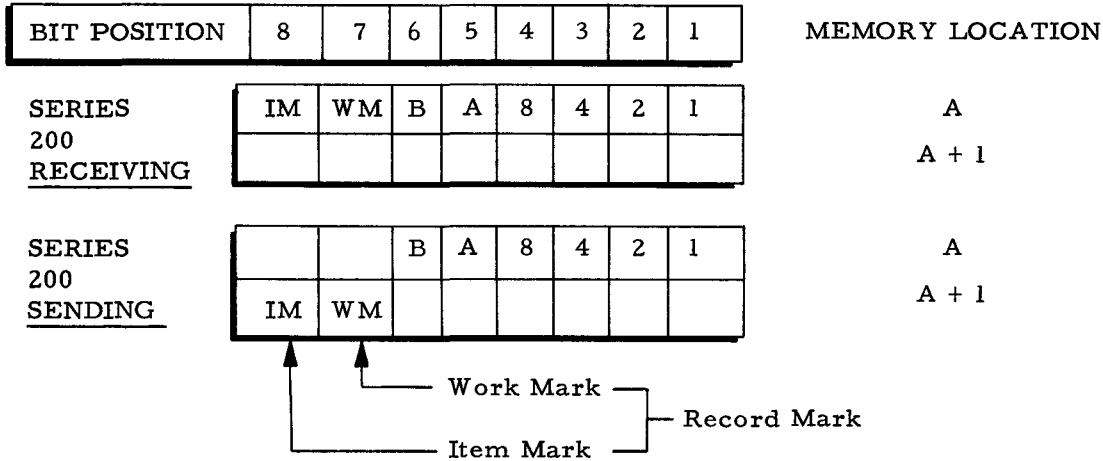
When data is being transmitted by the block method, a record mark is placed in memory location A+n (where n is the number of characters in a block) to terminate transmission of a group of characters. When data is being received, message (block) termination and release of the associated read/write channel are achieved by a record mark in memory location A+(n-1). Upon termination of the block, the read/write channel current location counter contains the address of A+n after transmission or reception of data.

- c. Type 285-1A Method of Transmission

The Type 285-1A Communication Adapter requires no record marks in its handling of data.

2. Type 281-1A Character in Main Memory

The Type 281-1A single-character configuration in main memory is illustrated below.



D. Line Disconnect

A line disconnect can be initiated from either end of the line. The following paragraphs indicate the possible types of line disconnect.

1. Manual Line Disconnect

The associated Western Union Teletype unit executes the manual line disconnect. No programming is involved.

2. Program-Initiated Disconnect

A PDT instruction with a C3 value of 01 is issued, which refers to a single-character A field. The A-field character for disconnect is 00. The communication control takes the necessary action for disconnecting.

If the operator wants to disconnect one unit, then start transmitting to another, the A-field character can be a FIGS character. Dialing procedure for the next unit starts immediately after the line in current use is disconnected.

3. Calling-Party-Initiated Disconnect

The calling-party-initiated disconnect and the disconnect caused by a "busy" signal being returned while dialing are handled in the same manner.

The program recognizes seven space characters (00) on the line for the calling-party-initiated disconnect and five space characters on the line for the busy condition and does not issue a "Transmit" PDT instruction.

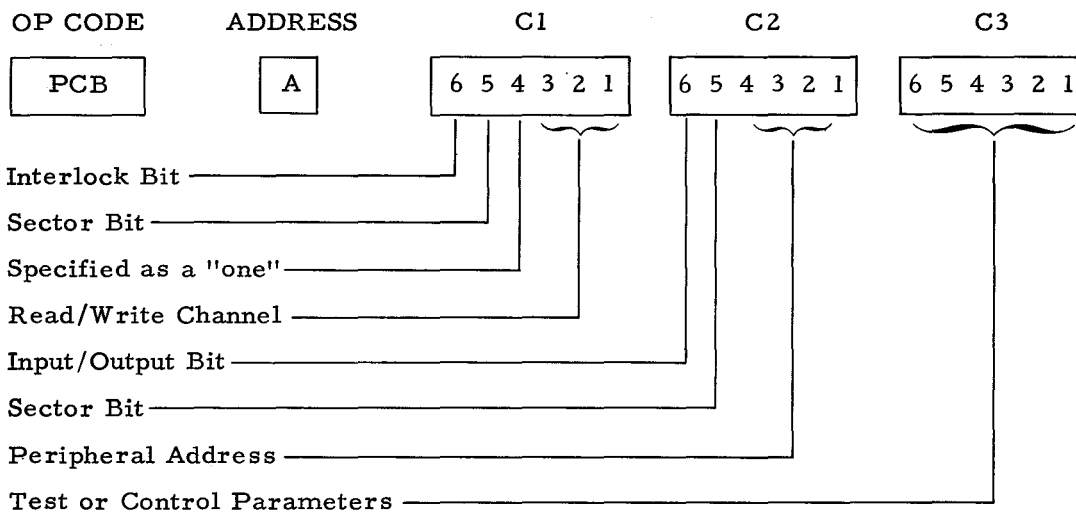
The communication control takes the necessary action to disconnect. Call reinitiation on busy signalling is accomplished by program.

4. Automatic Time-Out

No provision is made for automatic disconnect by time-out.

E. Peripheral Control and Branch (PCB) Instructions

The following PCB instruction format applies for all Series 200 central processors.



A Address — Memory location to which the program branches (in a branching PCB) if the condition tested for by the PCB instruction is true or an action can not be effected.

Interlock Bit — If this bit is a "one," high-speed transfer is specified.

Sector Bit — Selects sector 1 (zero) or sector 2 (one). The sector bit in control character C1 must agree with the sector bit in control character C2.

Read/Write Channel (RWC) — Selects the RWC between main memory and communication control. The low-order three bits of C1 contain the number of the RWC to be tested for availability and must be set to zero if no RWC is to be tested.

<u>SECTOR 1</u>	<u>SECTOR 2</u>
RWC1 = 001001	RWC4 = 011001
RWC2 = 001010	RWC5 = 011010
RWC3 = 001011	RWC6 = 011011
RWC1' = 001101	RWC4' = 011101

Input/Output Bit — zero = Transmit data from memory to communication control.
 one = Receive data from communication control.

Sector Bit — Selects input/output sector 1 (zero) or sector 2 (one). The sector bit in control character C1 must agree with the sector bit in control character C2.

Peripheral Address — Logical address of the communication control on the peripheral bus.

Test or Control Parameters — See Table II, page 15, for coding of C3 control characters. Additional control characters may be used if required.

Table II. PCB C3 Character Coding for Type 281-1A

PCB	DESCRIPTION	C3 (OCTAL)
	<u>NON BRANCHING</u>	
1. Set Allow Function	Allow Type 281-1A to interrupt Series 200 central processor.	71
2. Reset Allow Function	Prevent interrupts.	70
3. Reset Interrupt	Reset present interrupt by resetting the Interrupt function. Allows RNM instruction to be effective.	74
	<u>BRANCHING</u>	
4. Interrupt	Are the Allow and Interrupt conditions both set? If "yes," branch to A.	75
5. Busy	Is the Type 281-1A busy? If "yes," branch to A.	10
6. Device Error	Has an error occurred? If "yes," branch to A.	50
7. Output Request	Is the Type 281-1A requesting data for transmission onto the line? If "yes," branch to A.	60
8. Input Request	Is the Type 281-1A requesting that the CP take received data? If "yes," branch to A.	61

NOTE

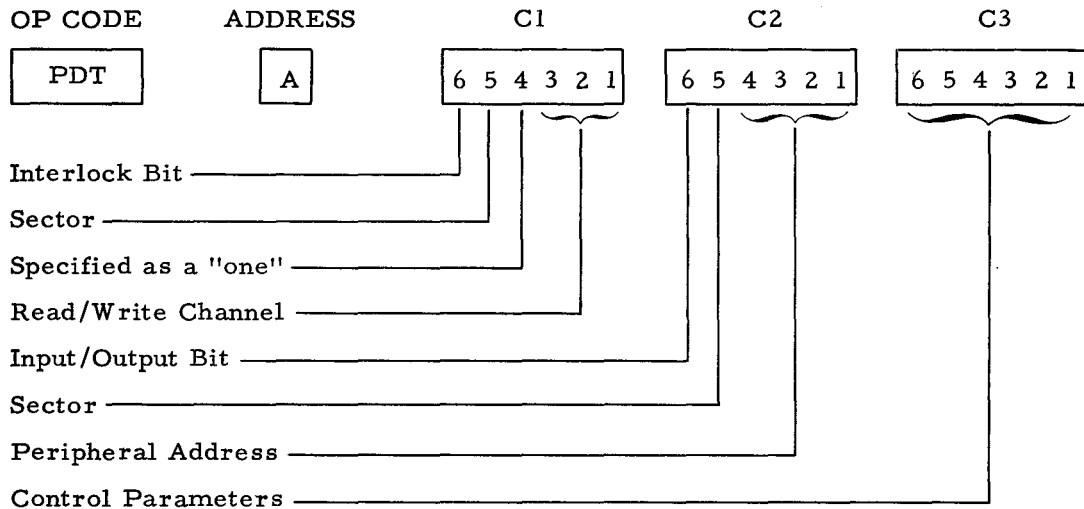
PCB C3 characters 70, 71, 74, and 75 exist only if the Series 200 central processor has program interrupt capability.

PCB instructions for Type 285-1A programming are in the bulletin Type 286-1, -2 and -3 Multi-Channel Communication Controls.

A PCB instruction to reset Allow is guaranteed to take effect only three memory cycles after the PCB instruction is issued.

F. Peripheral Data Transfer (PDT) Instructions

The following PDT instruction format applies for all Series 200 central processors.



A Address — Contains the address of the main memory location to or from which data is transferred in Type 281-1A programming.

Interlock Bit — If this bit is a "one," high-speed transfer is implemented.

Sector Bit — Selects sector 1 (zero) or sector 2 (one). The sector bit in control character C1 must agree with the sector bit in control character C2.

Read/Write Channel (RWC) — Selects the RWC between main memory and a communication control.

<u>SECTOR 1</u>	<u>SECTOR 2</u>
RWC1 - 001001	RWC4 - 011001
RWC2 - 001010	RWC5 - 011010
RWC3 - 001011	RWC6 - 011011
RWC1' - 001101	RWC4' - 011101

Input/Output Bit — zero - Move data from memory locations A, A + 1, ... A + n to communication control until a record mark is encountered.

one - Move data from communication control to memory locations A, A + 1, ... A + n until a record mark is encountered.

Sector Bit — Selects sector 1 (zero) or sector 2 (one). The sector bit in control character C1 must agree with the sector bit in control character C2.

Peripheral Address — Logical address of the communication control on the peripheral bus.

Control Parameters — See Table III, page 17, for description and coding of the C3 character only for the Type 281-1A.

Table III. PDT C3 Control Character

C3 (OCTAL)	DESCRIPTION
01	Causes the communication control to send the single character specified by the A address, then sends the disconnect signal to the teletypewriter. If the character in the A field is 00, disconnect procedures are started. If it is FIGS then, after completion of disconnect, the communication control starts dialing the next number.

G. General Program Timing Considerations

The program must empty the data buffer in the Type 281-1A Communication Control during the time interval of a stop bit — that is, within 30 milliseconds.

In the case of the Type 285-1A Communication Adapter, the program has a character time of 150 milliseconds in which to empty the buffer of the associated Type 286 Multi-Channel Communication Control.

If received data is not taken from the data buffer of the Type 281-1A or Type 286 within the specified time, data is lost. In this event, Error is set in the Type 281-1A or an error indication is stored in the Type 286.

If — in the Types 286/285-1A — a new character is not sent by the central processor during the specified time, no subsequent data is transmitted but the communication control remains in the transmit mode. Programming for the Types 286/285-1A is detailed in the bulletin Type 286-1, -2 and -3 Multi-Channel Communication Controls.

1. Single-Character Timing Consideration

- a. Set Allow: Timing of the interrupt in response to this PCB instruction is not predictable and should not be relied upon.
- b. Received Data: Data entered in response to a "Receive" PDT instruction is not guaranteed to be in main memory until 11 memory cycles after the end of the extraction of the PDT instruction.
- c. Transmitted Data: The data being transferred from main memory by a PDT instruction can not be changed until 14 main memory cycles after the end of the extraction of the PDT instruction.

NOTE

The read/write channel is busy until all the data is transferred. The communication control is busy for two main memory cycles longer than the read/write channel.

H. Types 285-1A/286 "Special Strobe" PDT Instruction

The program may utilize the "Special Strobe" PDT instruction, causing the control unit to send the disconnect signal to the dataset.

VII. General Operational Notes

A. Cutout Switch

The Western Union Telex station teleprinter unit is provided with a cutout switch. This switch is used to activate the computer (or teleprinter unit) or to deactivate the system, depending upon the type of adapter used. The following two points are of interest concerning the use of this switch:

1. Because of errors in mounting, the position energizing the switch to include the principal input/output device is indeterminate. This position can, however, be determined by experimentation and the two positions should be marked "Computer In" and "Computer Out" (TTY 32 In and TTY 32 Out) to avoid ambiguity.
2. The switch is intended only for test purposes; use of it during transmission causes a disturbance on the line and may cause the units to start operation on a false signal.

B. Operation of Local Teletype Unit

Normally, while a computer is either transmitting or receiving on the communication line, the teleprinter keyboard is not used. However, if provision is made in the program to avoid conflict between the computer and the local teleprinter unit, then data can be entered from the local teleprinter into the line and simultaneously into the computer.

C. Local Operation

The associated Western Union Telex station teleprinter unit may be operated in the local mode by depressing the LOCAL switch under the dial. Then, with the cutout switch in the proper position, communication is established between the local unit and the central processor.

If any calls are received while in the local mode, the LOCAL light is extinguished, CONN is illuminated, and the incoming call is connected.

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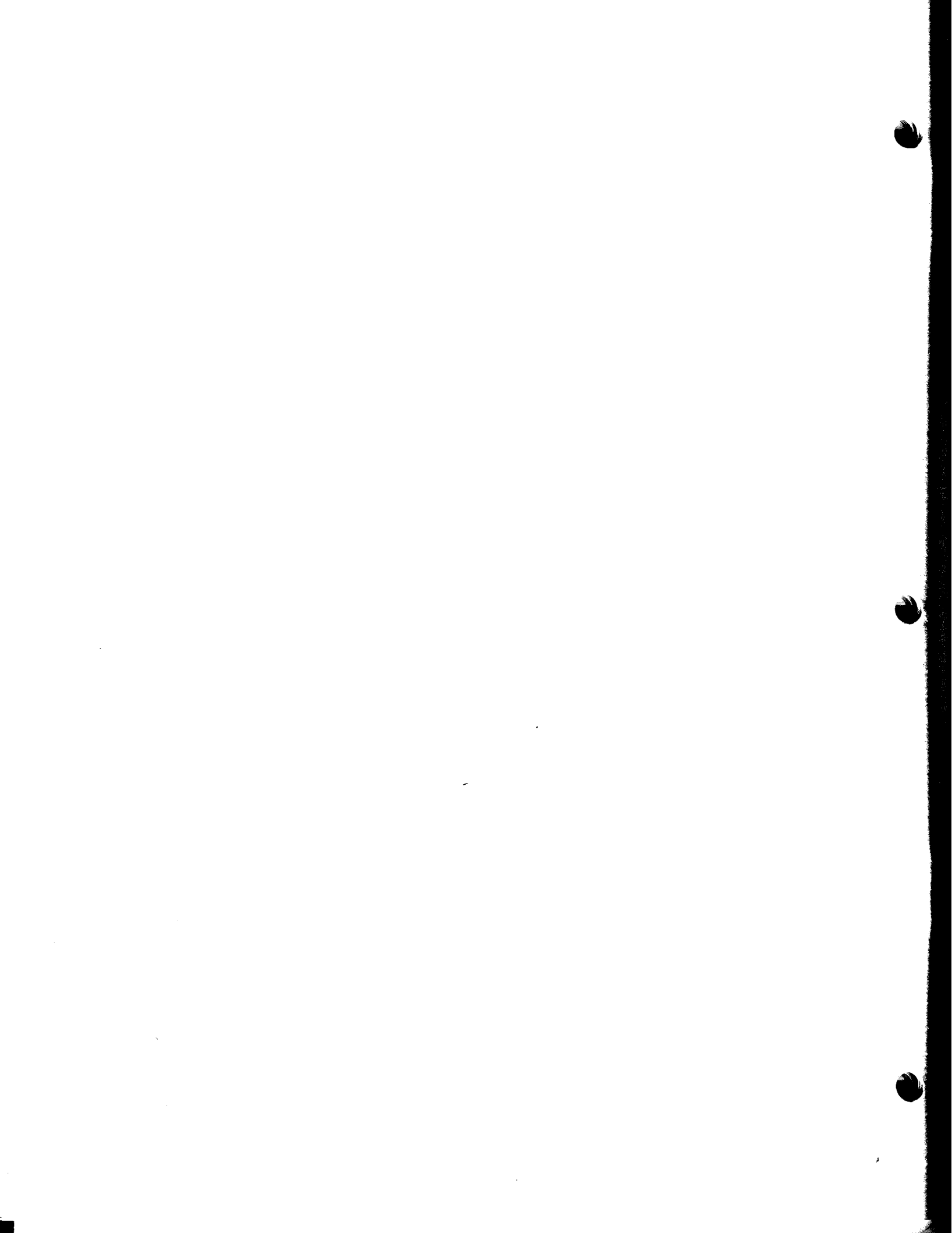
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HONEYWELL EDP TECHNICAL PUBLICATIONS
USERS' REMARKS FORM

TITLE: SERIES 200 TYPE 281-1A COMMUNI-
CATION CONTROL AND TYPE 285-1A
COMMUNICATION ADAPTER
HARDWARE BULLETIN

DATED: MAY, 1966

FILE NO: 112.0005.1100.0-110

ERRORS NOTED:

Fold

SUGGESTIONS FOR IMPROVEMENT:

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COMPANY _____

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