

BEFORE READING

*PLEASE CHECK FOR CHANGE INFORMATION
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TEKTRONIX®

7M13

READOUT UNIT

INSTRUCTION MANUAL

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Serial Number _____

070-1577-00

573

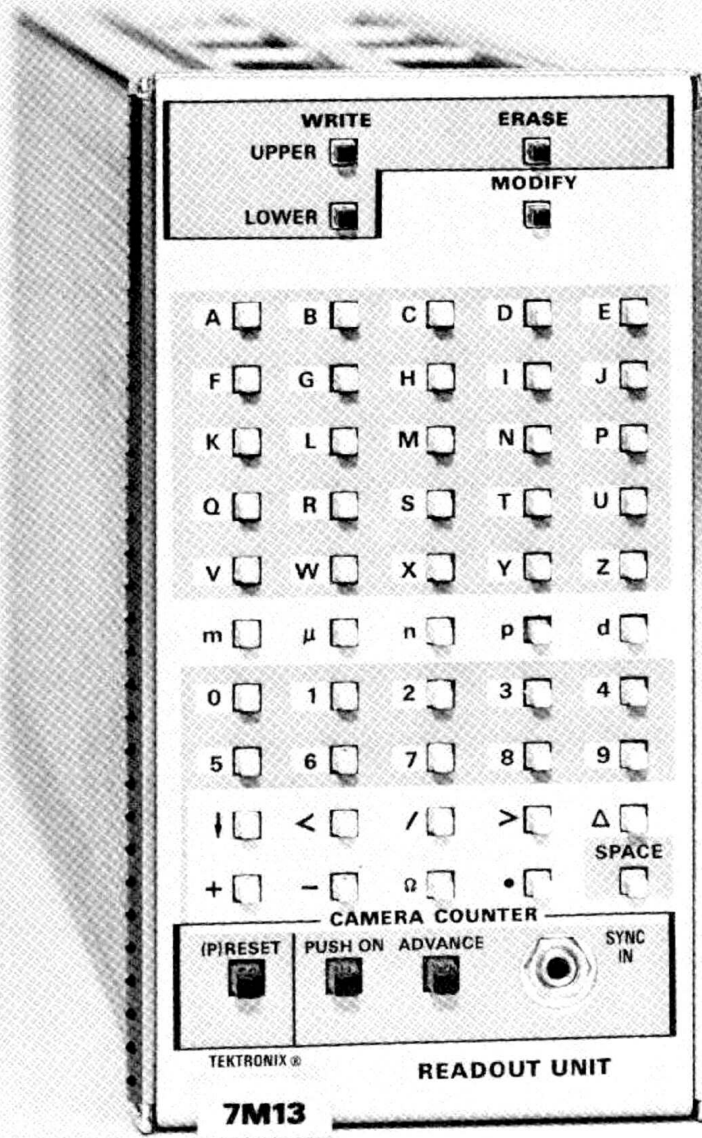


Fig. 1-1. 7M13 Readout Unit.

7M13 FEATURES

The 7M13 Readout Unit (Fig. 1-1) provides front panel keyboard operation of any Tektronix 7000 series oscilloscope readout system. A built-in camera counter displays a presettable camera count in channel 2. The camera count can be advanced manually by pushbutton or automatically through the operation of a camera shutter.

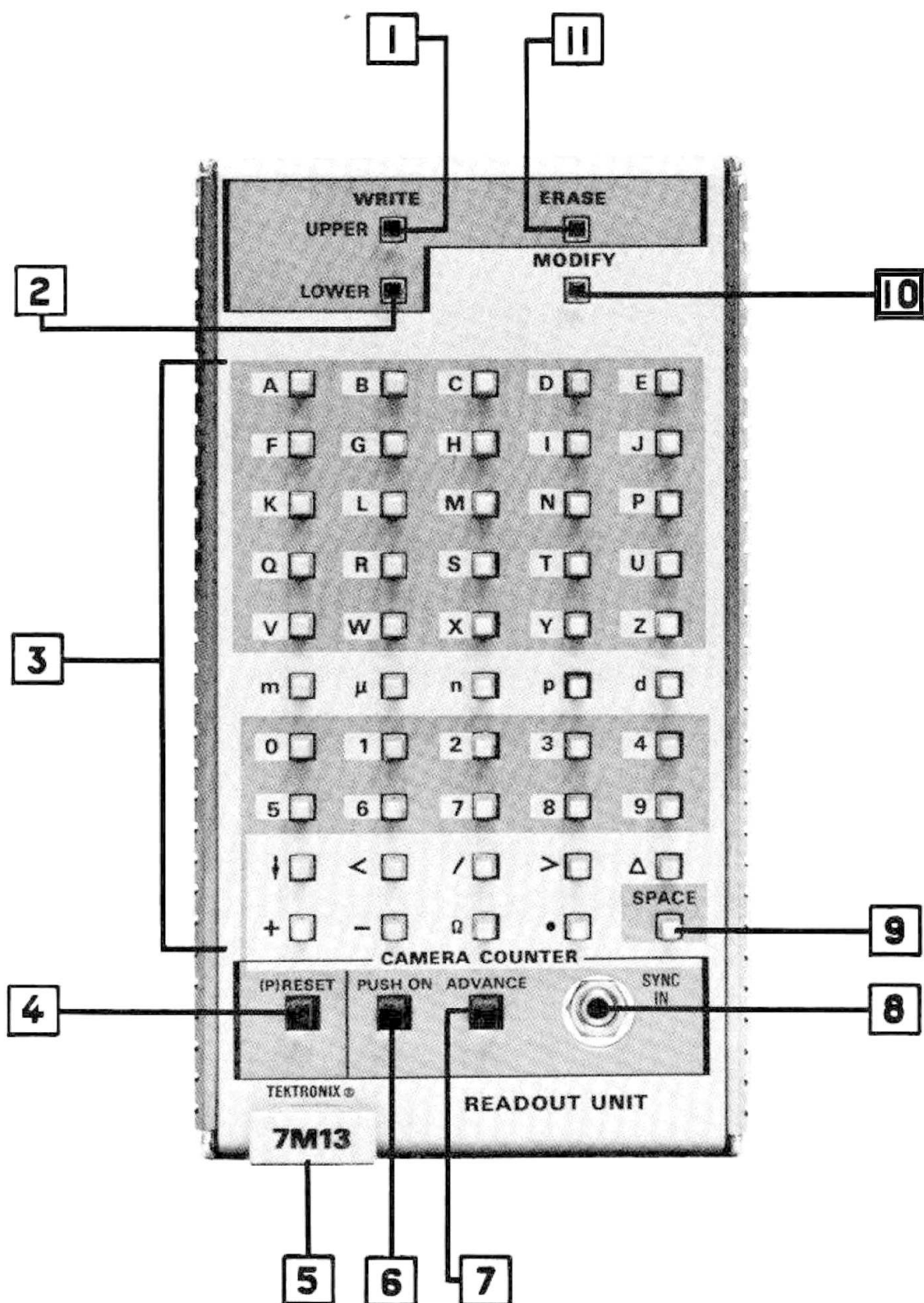


Fig. 1-2. 7M13 Controls and Connectors.

THEORY OF OPERATION

INTRODUCTION

The 7M13 Readout Unit provides front panel operation of the readout system of any Tektronix 7000 series oscilloscope. It will operate in any plug-in position in the oscilloscope mainframe. The readout display will appear on the CRT in the position associated with the selected plug-in compartment. Refer to the mainframe service manual for the readout system circuit description and to diagram 1 in this manual for the following circuit description.

THEORY OF OPERATION

The WRITE pushbuttons select either the UPPER or LOWER (channels 1 and 2 respectively) memory IC's for data storage. This routes the output of U202B through U168C for the UPPER and through U168D for the LOWER channel selection. The signal is then presented to the appropriate column and row memory, write enable inputs.

Each channel has a ten character capacity. As each successive character pushbutton is pressed, the output of U132C causes U198 to advance its count to the next character position address. This continues until all character positions are filled. U129B locks in the tenth position and is reset by pressing ERASE. Pressing a character button when all ten positions are filled will cause the tenth character to be replaced with the newly selected one.

The ERASE pushbutton, when pressed, fires single-shot U170B. The pulse from U170B clears U129B and allows pulses derived from time slot information (output of U163D) to be presented through U168A, U168B, and U132C to U198 (address-to-memory). The output of U168B is also presented to the write-into-memory circuits. These pulses cause U198 to count through all data addresses, while the write-into-memory circuits allow the data present on the data inputs to the row and column IC's to be written into the memories. No data is present on the inputs to the memories during ERASE. This "no data" condition is interpreted as a skip command and results in a blank display for that channel. When single-shot U170B returns to its normal state, it triggers single-shot U170A to reset U129B and the address-to-memory counter, U198.

Time slot pulses 2 through 10 are routed through Q177 and Q185. These pulses are used to advance U195, the read from memory address IC. Time slot 1 is routed through Q190 and is used to reset U195 at the end of each count.

The address multiplexer (U200) determines which address, either time slot (output of U195) or data (output of U198), will be directed to the memory select inputs. Normally, U200 directs time slot addresses to these inputs for data readout, however, when a character pushbutton is pressed on the front panel of the Readout Unit, the output of U202A causes the multiplexer to switch and read the address at the outputs of U198.

Pressing a character button supplies ground closures to the inputs of U109 (column data) and U103 (row data). U109 and U103 are decimal-to-BCD converters. They generate the coded character information presented to the memory data inputs; column data to U280 and U260, row data to U240 and U220.

Since all characters generate column data, the outputs of U109 (through diodes CR109, CR110, CR111, and CR112) are used to initiate the write-into-memory command signals and to trigger the address-to-memory. This signal, through U202A, is also used to switch the address multiplexer (U200) from the read-from-memory address (output of U105) so that data stored in the memories can be read and

displayed on the CRT. Only when a write command signal is present (output of U202A) can U200 read the address present at the output of U198. When the address-to-memory command signal is presented to the memories, information present on the data inputs to the memories will be accepted for storage. Once this is accomplished, U200 returns to reading the addresses from U195 (time slot information) and the newly stored character is displayed on the CRT.

The MODIFY pushbutton permits interruption of the address advance pulse (output of U132C). When pressed and held, the MODIFY pushbutton allows the last entered character to be changed regardless of its position in the display.

The SPACE pushbutton generates only row data, therefore, CR102 is used to allow generation of the write-into-memory and associated signals through the output of U168B. This allows data for space generation to be stored in the memories and displayed in the same manner as a character.

The camera counter works only through the lower, channel 2, display position. When the camera counter is selected, it causes time slots 9 and 10 to be reserved for the camera counter display. This is accomplished by the output of U166A which blocks the memories during these time slots to allow camera counter information from U159 (units digit) and U161 (tens digit) to be displayed.

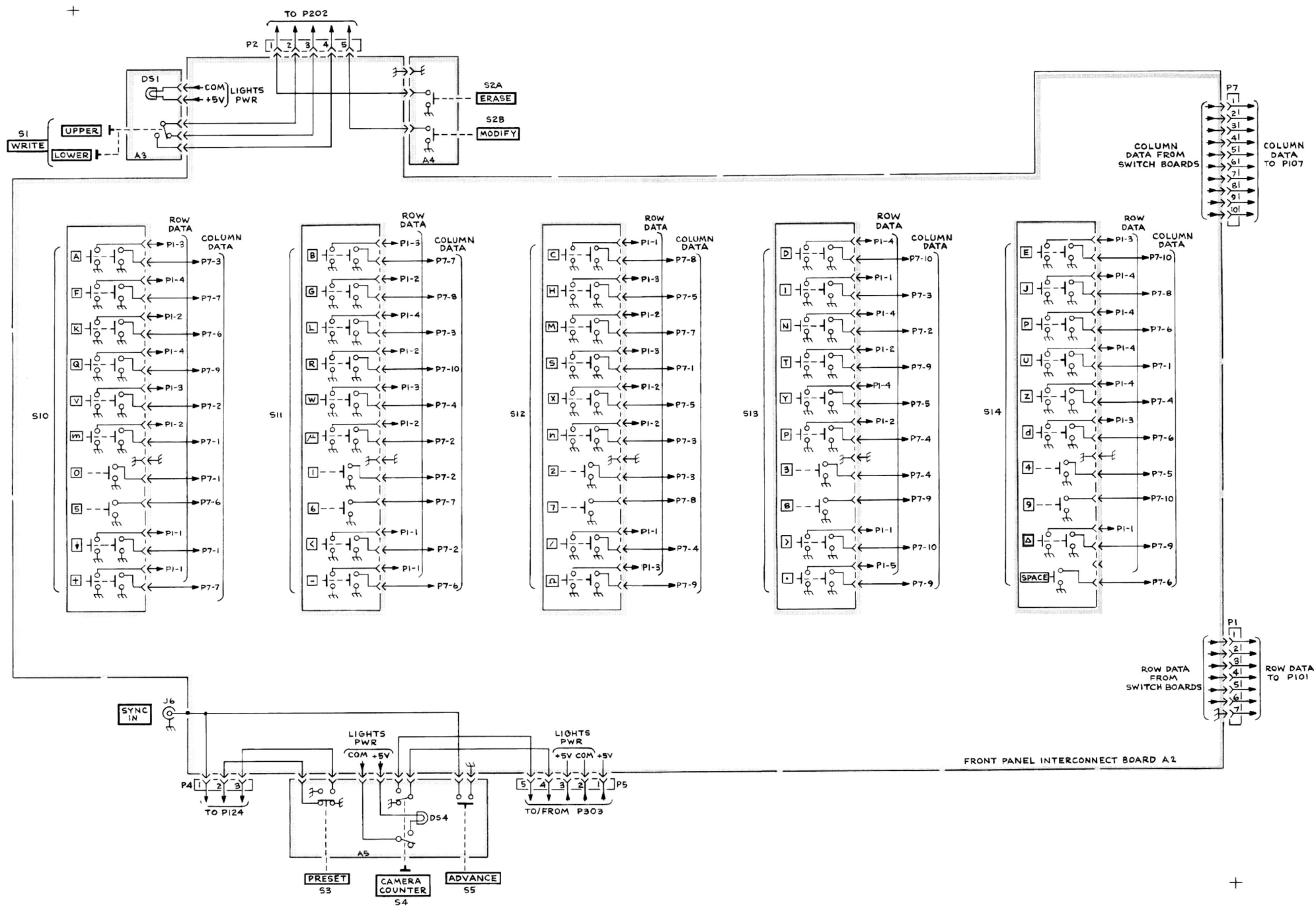
Pressing (P)RESET clears U129A, blocks U166D and resets U154 and U157 to zero. The output of U105E activates the current necessary for zero character generation when no data is present at the outputs of U159 and U161. Pressing a number pushbutton (while pressing and holding the (P)RESET pushbutton) enters that number in the tens position, U157, which is enabled by U132B. The action of U122, when the number pushbutton is pressed, causes U129A to switch. This allows the next number to be entered as a units digit in U154—now enabled by U132A.

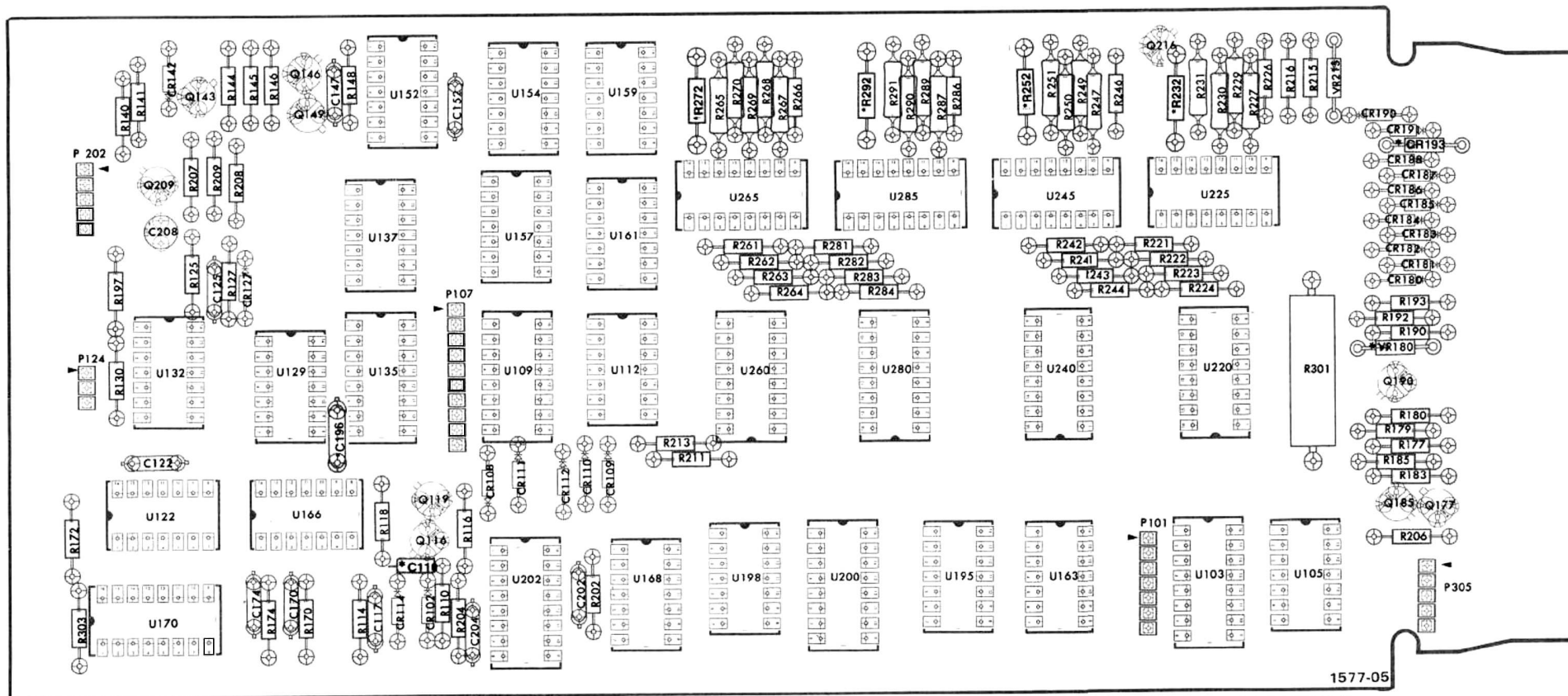
Camera counter data is presented to the inputs of U265 during time slots 9 and 10. U161 is activated by U163C during time slot 9. U159 is activated during time slot 10 by U163B.

The ADVANCE pushbutton, when pressed, provides a ground closure for advancing the camera count. The SYNC IN jack provides the same function when connected to a camera shutter.

The output of U202A provides an over-ride of the blocking action of U166A during time slots 9 and 10 when the camera counter is selected. This permits entry of other information during these time slots. The camera counter display is not erased by the ERASE pushbutton.

The outputs of U225, U245, U265, and U285 determine which characters are generated in the readout system. Refer to the schematic diagram for the functional identification of these IC's. These IC's convert the BCD input to an output current. This is accomplished by using the BCD inputs to select current inputs to pins 10, 11, 12, 13, and 14 which are used either singly or combined to produce the proper current outputs (row and column) for character generation in the readout system.





*See Parts List for serial number ranges.

LOCATED ON BACK OF BOARD
EFF. SN B059999 & BELOW
C196

Fig. 6-1. 7M13 Readout Unit Circuit Board.

