# INSTRUCTION MANUAL

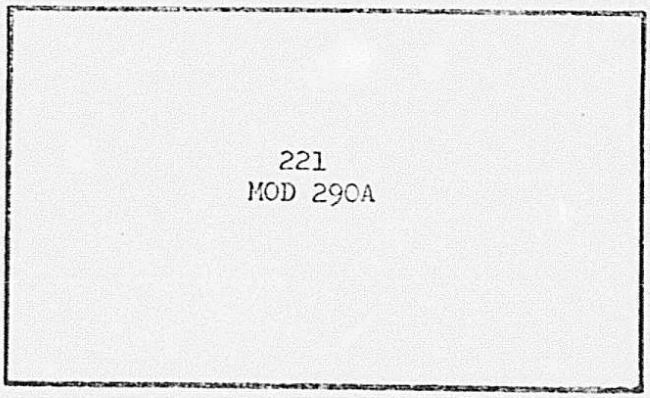
MODIFICATION INSERT

Serial Number _____

221
MOD 290A

This insert is provided as a supplement to the instruction manual furnished with this modified instrument. The information given in this insert supersedes that given in the manual.



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122277-A

061-1817-00

This manual insert describes the features of MOD 290A as it applies to the 221 Oscilloscope. The instrument is equipped with a single-sweep mode; in addition the legend "Property of" and IBM logotype have been added to the front panel, an "F &F" number tag added to the bottom of the instrument case, special probe accessories added, and spare fuses and Service Manual deleted.

NORM/S. SWP Switch. A two-position slide switch has been added to the side control panel. When the switch is in the NORM position, the instrument will operate normally in recurrent or triggered sweep modes; when the switch is in the S. SWP position, the sweep retrace is suppressed until the RESET pushbutton is depressed and released.

RESET Pushbutton. A miniature pushbutton has been added to the side control panel. The control functions only in the single-sweep mode to reset the sweep generator, thus allowing a single additional operation of the sweep.

POWER Light. An indicator light has been added at the upper portion of the front panel. When the light is on it indicates that the instrument is operational whether power source is AC or battery.

READY Light. An indicator light has been added at the lower-right portion of the front panel. When the light is on it indicates that the sweep is armed but has not gone through its single-sweep cycle; when the light is out it indicates that the single sweep has gone through its cycle but has not been reset.

## CHARACTERISTICS

RESET Control. Operation of the Reset pushbutton in the Norm mode, or during a sweep in the S.SWP mode has no effect. Holding down the Reset pushbutton during and after a single sweep will not defeat the single-sweep action. The pushbutton must be released and depressed again to obtain reset action.

READY Light. The light indicates only the armed-not-started sweep condition. The light is extinguished whenever a sweep has started.

INTENSITY Setting. Typically, relatively high settings of the Intensity control will be required for single-sweep observations and measurements. However, because the CRT will be at or near maximum power drain not only during the single sweep, but also before and after the sweep, operation in the S. SWP mode will typically yield close to minimum battery operation per charge

For "baby sitting" operation (sweep not observed; Ready light condition used only as a transition indicator over extended periods), the Intensity control should be set low, for maximum operating time on batteries (the precaution is unnecessary for AC or DC source operation).

SINGLE SWEEP PERFORMANCE CHECK PROCEDURE

| | | |
|---|---|---|
| CHECK: | That Power-indicator light is on when the Intensity/Power control is rotated CW from the detent position. The light will be on when the instrument is powered by battery or AC source. | |
| SET: | NORM/S.SWP | NORM |
| | LEVEL/SLOPE | AUTO PRESET |
| | SEC/DIV | .2 M |
| CONNECT: | A .5 P-P V, less than 5 MHz, signal source to the EXT TRIG input. | |
| CHECK: | For an on-screen repetitive sweep. | |
| SET: | NORM/S.SWP switch to S.SWP. | |
| CHECK: | That trace is not displayed. | |
| PRESS-RELEASE: | RESET button. | |
| CHECK: | For a single sweep across entire graticule area. | |
| DISCONNECT: | Signal source from EXT TRIG input. | |
| PRESS-RELEASE: | RESET button a few times at about five second intervals. | |
| CHECK: | That sweep is not initiated when the RESET button is pressed or released. | |
| CHECK: | That READY light is on. | |
| RECONNECT: | Signal source to EXT TRIG input. | |
| CHECK: | That a signal source is generated; the READY light should turn off at the completion of the sweep. | |

# PARTS LIST

## Electrical

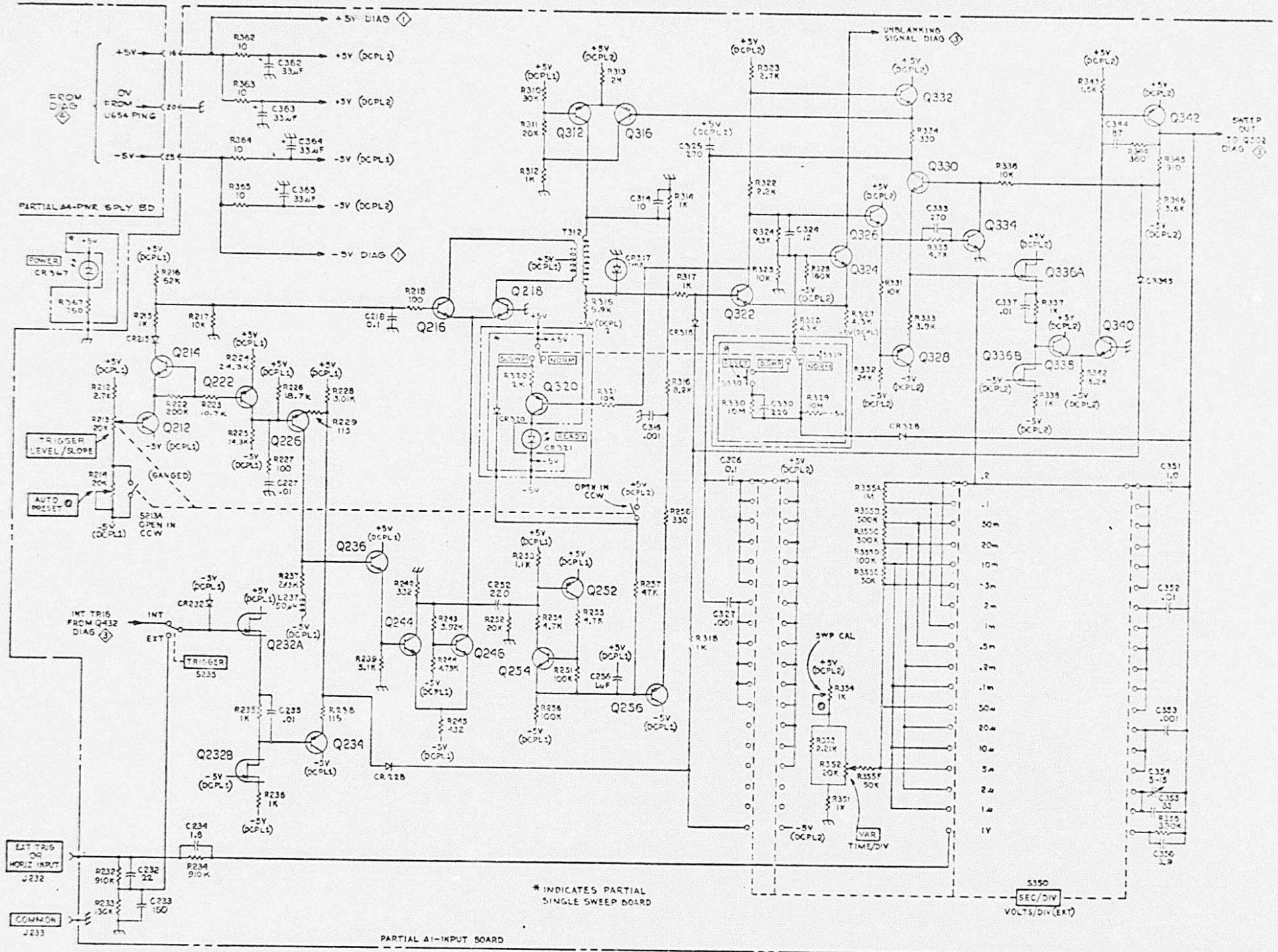
| | | | | |
|---|---|---|---|---|
| **CAPACITORS** | | | | |
| C330 | Add | | 283-0108-00 | 220 pF, 200 V |
| **DIODES** | | | | |
| CR320 | Add | | 152-0141-02 | Silicon, 1N4152 |
| CR337 | Add | Below SNB023762 | 150-1004-00 | LED, 2.5 V, 15 mA, Red |
| CR337 | Add | SNB023762 & Above | 150-1031-00 | LED, 40 mA, Red |
| CR367 | Add | Below SNB023762 | 150-1004-00 | LED, 2.5 V, 15 mA, Red |
| CR367 | Add | SNB023762 & Above | 150-1031-00 | LED, 40 mA, Red |
| **TRANSISTORS** | | | | |
| Q320 | Add | | 151-0342-00 | Silicon, PNP |
| **RESISTORS** | | | | |
| R320 | Add | | 315-0202-00 | 2 kΩ, 1/4 W, 5% |
| R329 | Add | | 315-0106-00 | 10 MΩ, 1/4 W, 5% |
| R330 | Add | | 315-0106-00 | 10 MΩ, 1/4 W, 5% |
| R367 | Add | | 315-0751-00 | 750 Ω, 1/4 W, 5% |
| **SWITCHES** | | | | |
| S329 | Add | | 260-1766-00 | Push, SPST -- RESET |
| S330 | Add | | 260-1641-00 | Slide, DPDT -- NORM/S. SWP |

## Mechanical

| | | | |
|---|---|---|---|
| Socket, mini | Add | 1 | 136-0250-01 |
| Screw, 4-40 x 1.875" | Add | 2 | 211-0131-00 |
| Screw, 4-40 x 2.75" | Delete | 2 | 211-0170-00 |
| Tag, ID, IBM | Add | 1 | 334-2478-00 |
| Bushing, LED Lamp | Add | 2 | 352-0360-01 |
| Stud, carrying holder | Delete | 2 | 355-0181-00 |
| Panel, Side | Change | 1 | 386-3300-00 |
| Circuit Board (unwired) | Add | 1 | 388-4419-00 |
| Single-Sweep Circuit Board Assembly | Add | 1 | 670-3852-00 |
| Pad, silicon foam (self adhesive) | Add | 4 | |

## Accessories

| | | | |
|---|---|---|---|
| Manual, Service | Delete | 1 | 070-1573-00 |
| Fuse, 0.2 A, 250 V | Delete | 2 | 159-0080-00 |
| Probe Tip, ground SLT | Add | 1 | 206-0137-01 |
| Probe Tip, ground SLT | Add | 1 | 206-0209-00 |
| Strap, carrying | Delete | 1 | 346-0104-00 |



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