AD NUMBER
AD009169
LIMITATION CHANGES
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AUTHORITY
NAVSEA ltr dtd 1 Apr 1968

AD NUMBER
AD009169
CLASSIFICATION CHANGES
TO: **unclassified**
FROM: **confidential**
LIMITATION CHANGES
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AUTHORITY
31 Dec 1964, DoDD 5200.10; Pre-dates formal DoD distribution statements. Treat as DoD only.

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CONFIDENTIAL COPY NO. 3

INTERIM DEVELOPMENT REPORT

FOR

TELEVISION TARGET TRACKING DEVICE, SUBMARINE

This report covers the period of November 1st to December 1st, 1952.

SKIATRON ELECTRONICS & TELEVISION CORPORATION
30 East 10th Street
New York 3, New York

NAVY DEPARTMENT | BUREAU OF SHIPS | ELECTRONICS DIVISION

Contract NObsr-57359 | INDEX No. 020632 | Dec. 10, 1952.

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TELEVISION TARGET TRACKING DEVICE, SUBMARINE

ABSTRACT

Work is in progress under Contract NObsr-57359 on the development of a dark-trace storage system for television images. Activity has been completed to the point where a mechanical model is being tested and completion of final mechanical and electrical design is under way. The AN/UXA-5 camera chain is now being used for test purposes. Video Quantizing and "contour level" circuits are described, and test photos of resultant effects are included in this report. A nearly complete schematic diagram is also included.

TELEVISION TARGET TRACKING DEVICE, SUBMARINE

REPORT #5

INTERIM ENGINEERING REPORT

for

TELEVISION TARGET TRACKING DEVICE, SUBMARINE

PART I.

A. PURPOSE

The purpose of work under Contract NObsr-57359 (Index NE-020632) is the development of an electronic device for the visual presentation of stored television images. One application of the proposed unit will be the detection of motion by comparison of television images of a specific area taken from time to time with pictures of the same area previously stored. The present investigation calls for the use of the dark-trace or Skiatron tube for the storage function.

B. GENERAL FACTUAL DATA

1. Identification of Personnel

The following personnel have been assigned to this project and have expended the indicated time for the period ending December 1, 1952:

	Hours Nov. 1 - Dec. 1
a. William J. Shanahan Chief Electronics Engineer	92½
b. Max Kerman Electronics Engineer, Intermediate	142½

	Hours Nov. 1 - Dec. 1
c. Samuel Jacobs Electronics Engineer, Development	157½
d. Francis Rebhun Electronics Engineer, Development	150
e. Richard Vetter Electronics Engineer, Junior	3
f. Benedict Palumbo, Technician	141
g. Louis Wozniak, Designer	110

2. Patents

Patent information concerning the previous work done by Skiatron on related subjects is covered in Report No. 1, dated August 10, 1952, and there has been no patentable activity during the present report period.

C. DETAILED FACTUAL DATA

Work up to December 1, 1952, has been directed toward the completion of the final model of the subject equipment and finalization of all circuits for switching remote control, writing, erasing, etc. Construction is in progress and is expected to be completed during the month of December, 1952. All of the individual circuits have been tested on previous units and only final testing of the unit to be shipped will remain at that time. The entire main chassis of the preliminary unit has been completely rewired and additional bracketry to support high voltage supply, high voltage relays, stepping switches, clamping and other components whose

location is critical have been made. Front panel engraving has been completed, a blower has been installed, and most of the mechanical work is either under way or has already been completed.

1. Quantizing and Contour Circuits

There has been only little change in circuit characteristics except for minor details regarding rearrangement of electrical and mechanical functions, etc. For this reason a nearly complete schematic is available and is included with this Progress Report. One additional circuit, however, has been built and tested. This circuit employs the output from the video quantization circuits described earlier, and by means of suitable differentiation and pulse forming circuit converts the three-level presentation into a "contour" presentation where each of the levels of selected video intelligence is outlined by a ring of dark signal.

It has been found that this mode of presentation is particularly suitable for operation with relatively stable targets with good contrast, since small changes in the picture can be made readily apparent. A three-position switch on the front panel will select either normal video, quantized video or contour signal. Included in this report, in Figures 2 and 3, is a series of photographs of the effect of video contour and quantizing signals when displayed on a conventional cathode-ray tube. The difference between the original scene and the other two means of representation is quite striking.

It will be noted, in the "contour video" picture, that both edges of each quantized area are shown with the same polarity.

This results from the use of two pulse generating coils, whose output is mixed in the video circuitry. If simple differentiating circuits were used, alternate edges of quantized area would be of opposite polarity.

2. Project Schedule

The proposed schedule of work on the subject contract is shown in Figure 1. Approximately 85% of the work has been completed to date. The only difficulties which have manifested themselves in the construction of the unit have been the slow delivery of a number of components which are expected shortly. It is expected, therefore, that the entire unit will be completed according to the original schedule during the month of December except for any minor delays which may be introduced by this slow delivery.

Final testing will take place during the month of January and it is expected at the conclusion of these tests, during the middle of January, that a representative of the Bureau of Ships will observe a demonstration of the equipment in the laboratories. During this time, also, it is expected that finalization of the instruction book and microfilming of the drawings employed in the construction of the unit will be taken on and completed. The instruction book will therefore be ready in early February 1953. Total costs to December 1st were $34,113.63.

D. CONCLUSIONS

Work to date has been concentrated on the construction of the final unit for shipment. All circuit layout has been completed

and construction is under way. Final details of the electronic portions of the unit are being cleaned up and a number of mechanical features are being added.

PART II.

Program for the Next Interval

Work presently under way on equipment construction will continue with the aim of completion of the equipment during the middle of the next report period with final testing to occur during the end of December and the early part of January.

William J. Shanahan

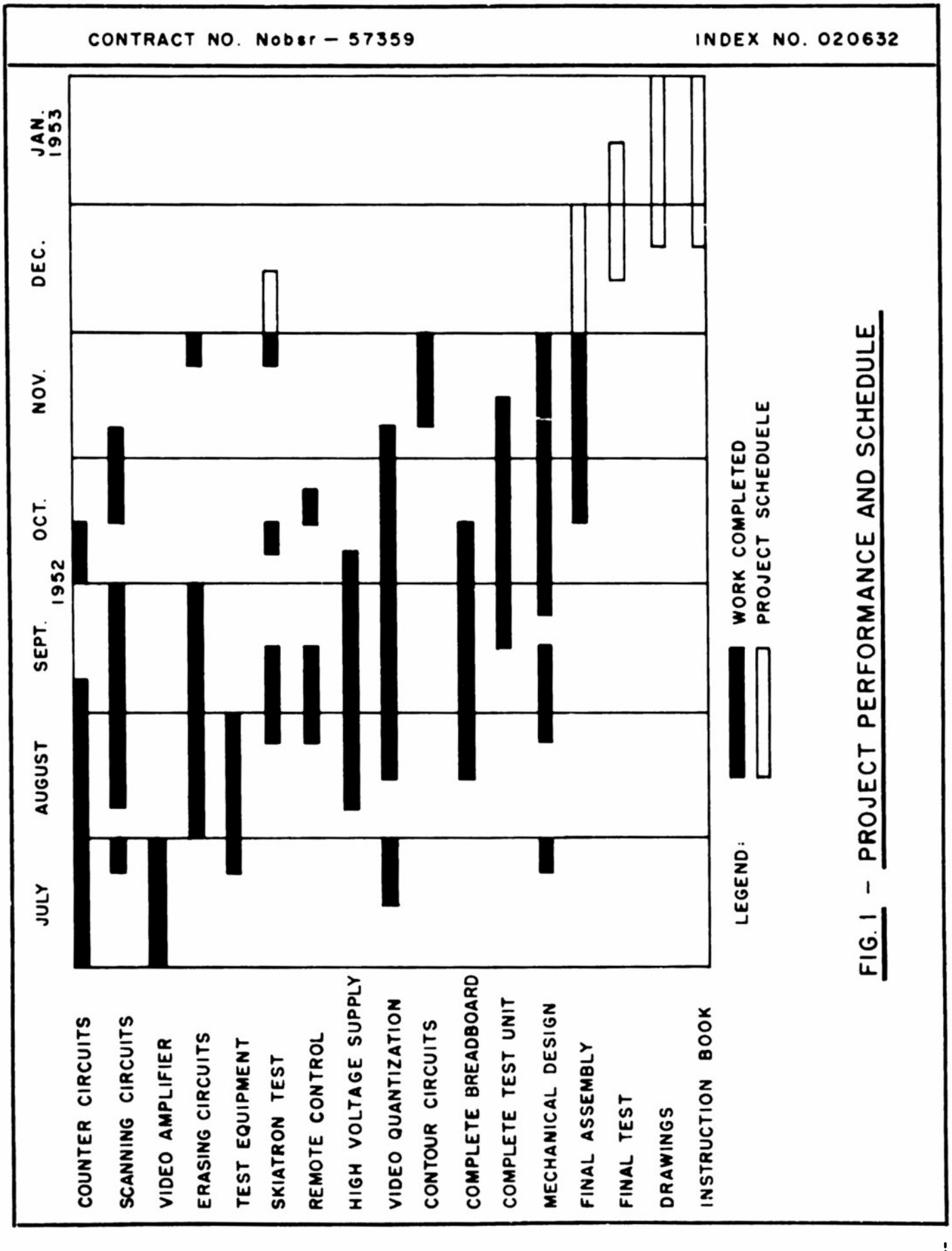


FIG. 1 – PROJECT PERFORMANCE AND SCHEDULE

CONTRACT NO. NObsr – 57359 INDEX NO. 020632

ORIGINAL SCENE

ONE-LEVEL QUANTIZATION

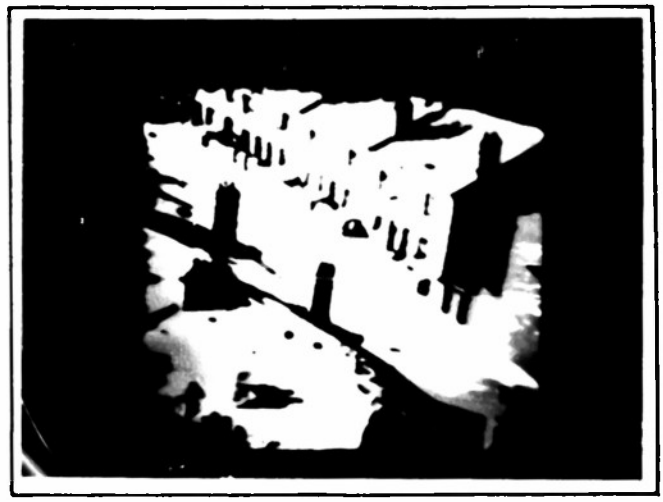
TWO-LEVEL QUANTIZATION

CONTOUR VIDEO PRESENTATION

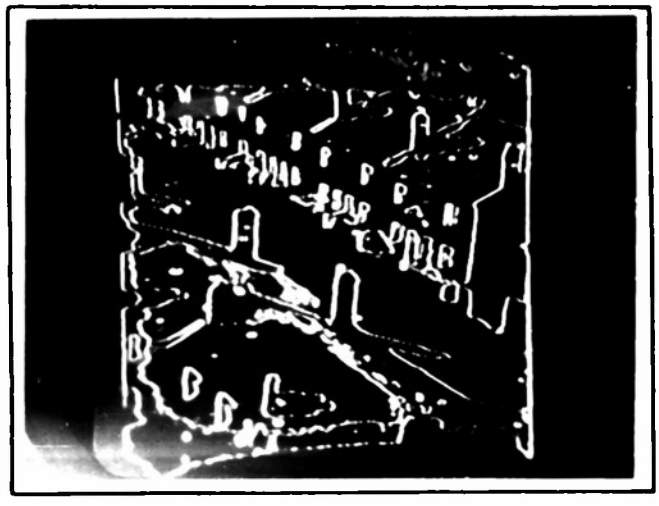
FIG. 2 QUANTIZED VIDEO

CONTRACT NO. NObsr – 57359 INDEX NO. 020632

ORIGINAL SCENE



TWO-LEVEL QUANTIZATION



CONTOUR VIDEO
PRESENTATION

FIG. 3 QUANTIZED VIDEO

TOLERANCES UNLESS OTHERWISE SPECIFIED

DECIMAL DIM. ± .005 FRACT. DIM. ± 1/64

SCALE-

V-1 12AX7 V-2A 12AT7 +305V. TP-8 .1μf 10K 22K 1M 33K 100K .5μf 25μf 50V. 10K 25K -150 V. .5μf

MIXED DRIVE J-1 .1μf

V-3A 12AT7 + 150 V. 10K 33K 2.2M 100K IN34A 500

V-4 12AT7 + 300 V. 2.2M 4.7K 6.8K 220K .05 Mf 2.2M 2.2M 750 10K R-1 HOR. SAW-TOOTH 25K .01μf 100 TP-3 820K 1W TP-1

V-5 6CDG-G 33 1W 200 10W 100μf - 50V. .5 μf 50K 2.5K 5W R-2 HOR. SIZE

T-1 HOR. OUT. TRANS. (30Ω) DUMONT # DE-21420-1 A D B E C F 30mh L-1 HOR. SIZE 5-25 mh

F-5 .25A 250V.

V-6 6AS7 100 100 .01μf 16μf 450V. R-3 390K 1W 500K

V-3B 12AT7 +150V. 150K 100K 5K .1μf 2μf 2.2M .1 μf IN34A .05μf 68OK 10M 500

V-7 12AT7 100K 5M R-5 5.6M 1M .047 μf TP-2 2.2M .5μf .05 μf

V-8 + 300V. 6AU5-GT L-4 VERT. CHOKE DUMONT #DE-21699-3 20h 100 TP-5 10M 330-2W + 500 μf 25V. + 150V. VERT. LIN. R-6 50K + 20μf - 450V. 82K-1W L-3B DEFLECTION YOKE DUMONT #CX-116 (VERT. OUTPUT) RED 10K 5.8 10K PURPLE .1μf VERT. DAMP. 25K R-7 1K 5W + 80μf - 450V.

R-8 VERT. CENT. 1K-2W 25K 10K

V-9 12AT7 .5μf IN34 2K 1M 2μf 270K 100K 1M 3K -150

TP-6

V-15 6AG5 1K .1 82μμf

V-16 6AS6 + 150V. 3.6K 2.7K .1μf IN34A 500

V-17 6AK5 .05μf 180

V-18 6AK6 .1μf 1M 2.2K

V-19 6AK6 + 305 V. 7.5K 5W 4.7K .25 .25 μf +150V. 1M 470K 25μf 50V.

V-20 807 3K 20W NIT

J-2 VIDEO INPUT .1 Mf 1M 100 1K VIDEO GAIN R-9 100μf 15V. 10K 82μμf 10K 1M IN34A 500 1M 100μf 15V. 10K 82μμf 10K 5.6K 470K TP-7 47K 100K 24K -150V.

V-21 12AT7 R-21 + 150V 22K 10K TP-17 + 10μf 450V. .1μf 500K 10K

VIDEO QUANT. VIDEO CONTOUR OUTPUT S-15

V-22A 12AT7 22K 15K 2W 1K .25 5K R-17 25μf 50V. 1N38 100K 560

V-23 6AK5 2.2K 2W 1K 150K 3.9K

V-22B 12AT7 22K 15K 2W 1K .25 5K R-18 1N38 100K

V-29 6AK5 150K

V-33 6JG6 +150V. 3.3K 10μf-450V. 47 .1μf 2K 470K 220

V-34A 6JG6

J-5 GATED VIDEO OUTPUT J-6

T-2

V-58 6AQ5 V-59 6AQ5 TP-15 +500V. +500V.

V-43 6AQ5 V-44 6AQ5 V-45 6AU6

K-2

L-5

1

L-2 (12.5μ)
HOR. CENT. CHOKE
DUMONT
#DE-21391

L-3A
DEFLECTION YOKE
DUMONT # CX-116 (75μ)
(HOR. DEFLECT. WINDING)

2 BRIDGING LEVELS

V-6
6AS7

V-55

V-9
12AT7

R-8
VERT. CENT.

V-10
6JG
HOR. SAFETY

V-11
6JG
BLANK.

V-12
6JG
VERT. SAFETY

V-13
6JG
WRITE

V-14
6JG

V-22A
12AT7

V-23
6AK5

V-24
6AK5

V-25
12AT7

V-26A
12AT7

V-27
6AK5

V-28
6AS6

V-22B
12AT7

V-29
6AK5

V-30
6AK5

V-31
12AT7

V-26B
12AT7

V-32
6AK5

V-35A
12AU7

K-1

K-6

K-7
DELAY RELAY

K-8
ERASE RELAY

K-9
ACCEPT RELAY

S-1
S-2
S-3
S-4A
S-4B
S-4C
S-4D
S-4E
S-5A
S-5B
S-6
S-12
S-16

J-3
QUANTIZED VIDEO OUTPUT

J-4

J-7

I-5

TP-4
TP-9
TP-10
TP-16

+305V.
+300V.
+500V.
+150V.
-150V.

14KV

PART OF STEPPING SW.

INT. SW.

MOTOR MAGNET S-4G

ERASE

REMOTE

LOCAL

VIDEO

ACCEPT

FILAMENT

2

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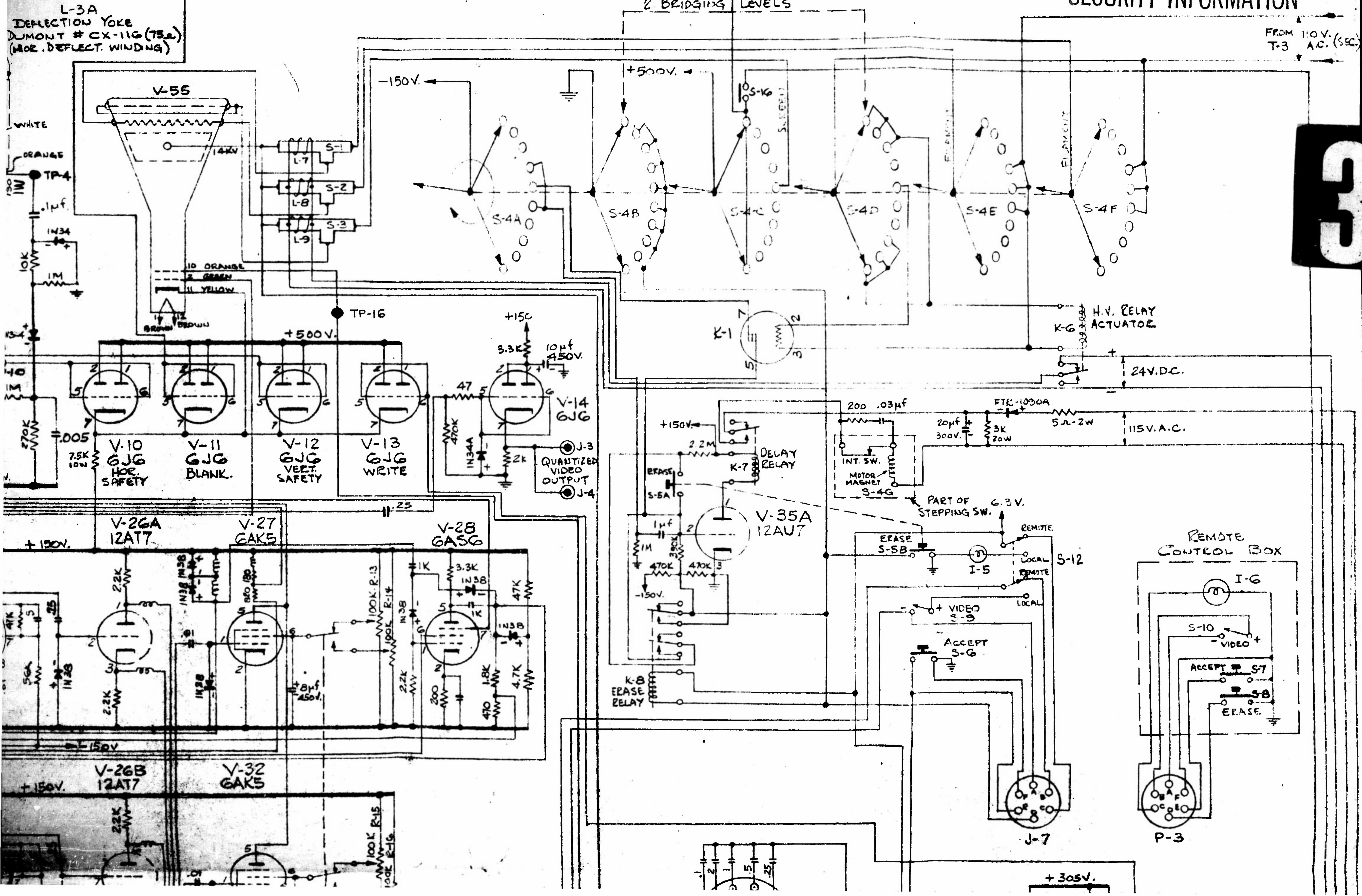
SECURITY INFORMATION

3



J-5
GATED VIDEO OUTPUT
J-6
2K
470K
220
.1μf
47
V-58 6AQ5
V-59 6AQ5
TP-15
+500V.
V-43 6AQ5
V-44 6AQ5
V-45 6AU6
T-2
YELLOW
YELLOW
RED
RED-YELLOW
RED
BLACK
BLACK
L-5
4μf
15μf
V-37 5R4-GY
V-38 5R4-GY
K-2
4.7K
10K
V-57 0A2
+150V.
R-10 FOCUS
F-3 .1A. 125V.
F-4 .1A 125V.
250K
47K-2W
47K-2W
100K
470K
R-11 B+ ADJ. +300V.
1M
TP-11
+ 300 V. REG. @ 160 ma
20μf 450V.
K-4A OVERLOAD RELAY
+325V @ 375ma
T-3
5V.@ 6a
L-6
100Ω
20μf 450V.
10μf 450V.
+ 305V. @ 95ma UNREGULATED
K-3
I-3
V-46 6AS7
100K
100Ω
100Ω
V-47 6AU6
470K
100K
R-12 B+ ADJ. +150V.
470K
TP-12
+ 150V. REG. @ 240 ma
20μf 450V.
V-39 5U4-G
V-40 5U4-G
V-41 6X4
V-42 6X4
110V.@ 350ma ±10%
P-1
A
B
S-11
K-4B RESET
I-1
F-1 10A 250V.
F-2 10A 250V.
I-2
115V ±10% 60~
TP-14
6.3V.
6.3V. @ 36a
I-4
6.3V. @ 8a. (+150V.)
6.3V.@ 2a (+300V)
24 V. @ 2a
5K-20W
10μf 400V.
20μf 400V.
TP-13
- 150 V. REG.
V-48 OD3/VR-150
J-9
Z-1 STARTER
I-7
S-17
L-10 BALLAST
WHITE
BLUE
BLACK
+150V.
V-54 6AK6
180
.05
1M
22K
22K
15K 2W
1K
.25
.25
.25
5K R-18
25μf 50V.
1N38
100K
560
1K
150K
25μf 25V.
38K
150K
P-2
WHITE
WHITE
YELLOW
YELLOW
RED
BLACK
BLACK END.
2W
AC.
V-4
12A

4

	GENERAL REVISION	12-16-52	
	GENERAL REVISION	12-3-52	
	GENERAL REVISION	11-24-52	
	GENERAL REVISION	11-11-52	
	REVISION	DATE	APP'VD.

-150V.

S-14

K-9 ACCEPT RELAY

-150V.

+150V.

V-54
6AK6

RED
24V. A.C.
BLACK
YELLOW
CP-1
24V D.C.

S-13A

S-13B

K-5

115V A.C.

L-11

RED
BLK
YELLOW

V-49
12AU7

V-51
6AU6

V-52
6LG-G

HI VOLTAGE SUPPLY

V-53
1B3-GT/8016

+500V.

2.5mh

P-2

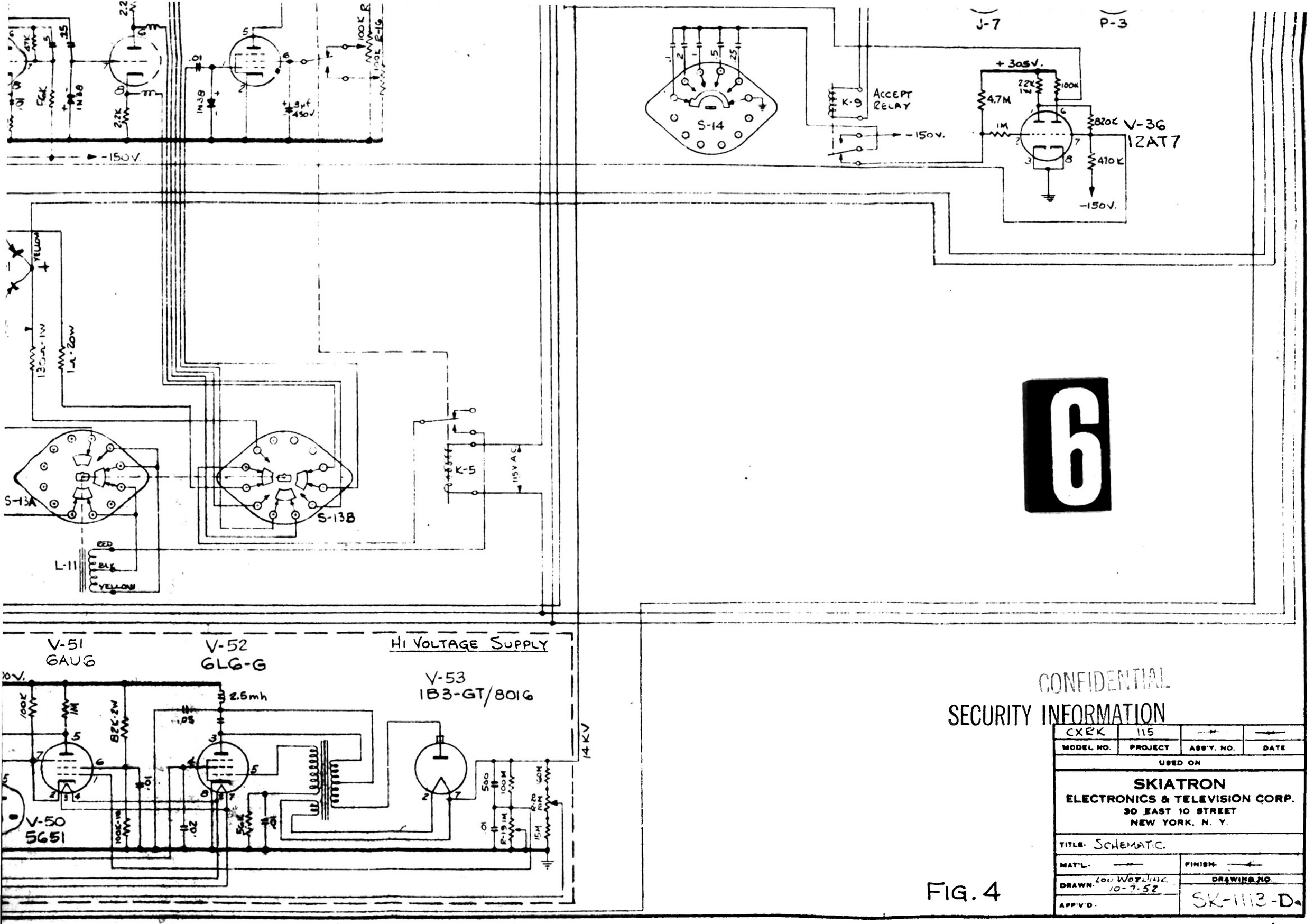
WHITE
WHITE
YELLOW
YELLOW
RED
BLACK
BLACK

V-50
5651

14 KV

5

FIG



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SECURITY INFORMATION

FIG. 4

CXRK	115	—	—
MODEL NO.	PROJECT	ASS'Y. NO.	DATE

USED ON

SKIATRON
ELECTRONICS & TELEVISION CORP.
30 EAST 10 STREET
NEW YORK, N. Y.

TITLE: SCHEMATIC.

MAT'L. —	FINISH —
DRAWN: Lou Wertlieb 10-7-52	DRAWING NO. SK-1113-D
APP'V'D.	