APRIL 1971 A HARCOURT BRACE JOVANOVICH PUBLICATION

ELECTRONIC TECHNICIAN/DEALER

WORLD'S LARGEST TV-RADIO SERVICE & SALES CIRCULATION

Mastering the TV Antenna Systems Market

Television Signal Injection

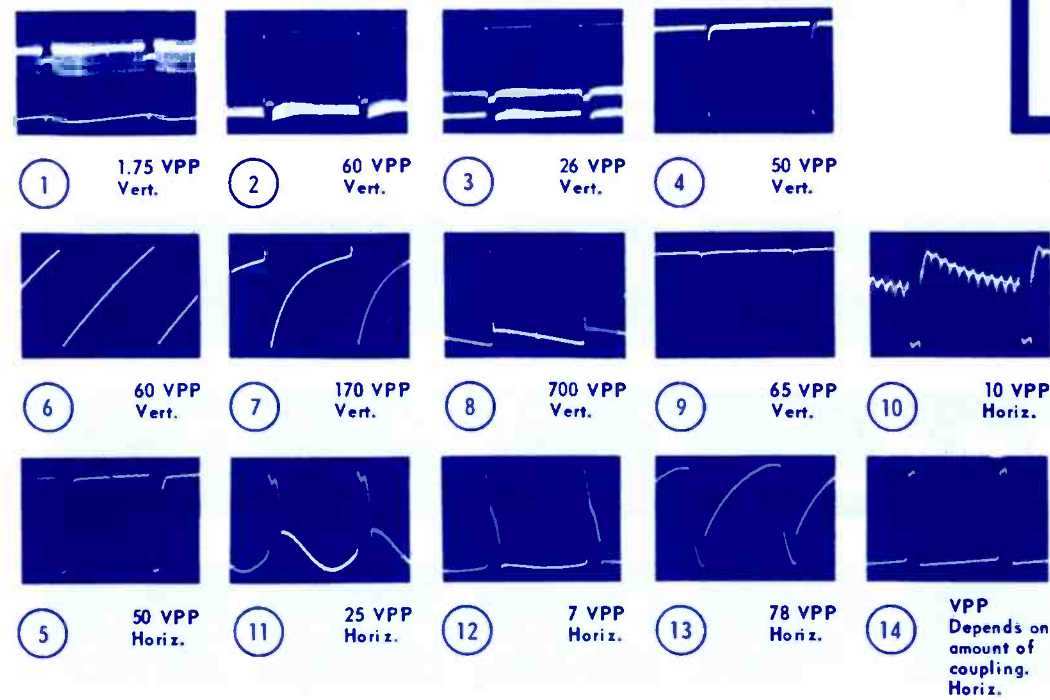
Closed-Circuit Television

ELECTRONIC TECHNICIAN/DEALER

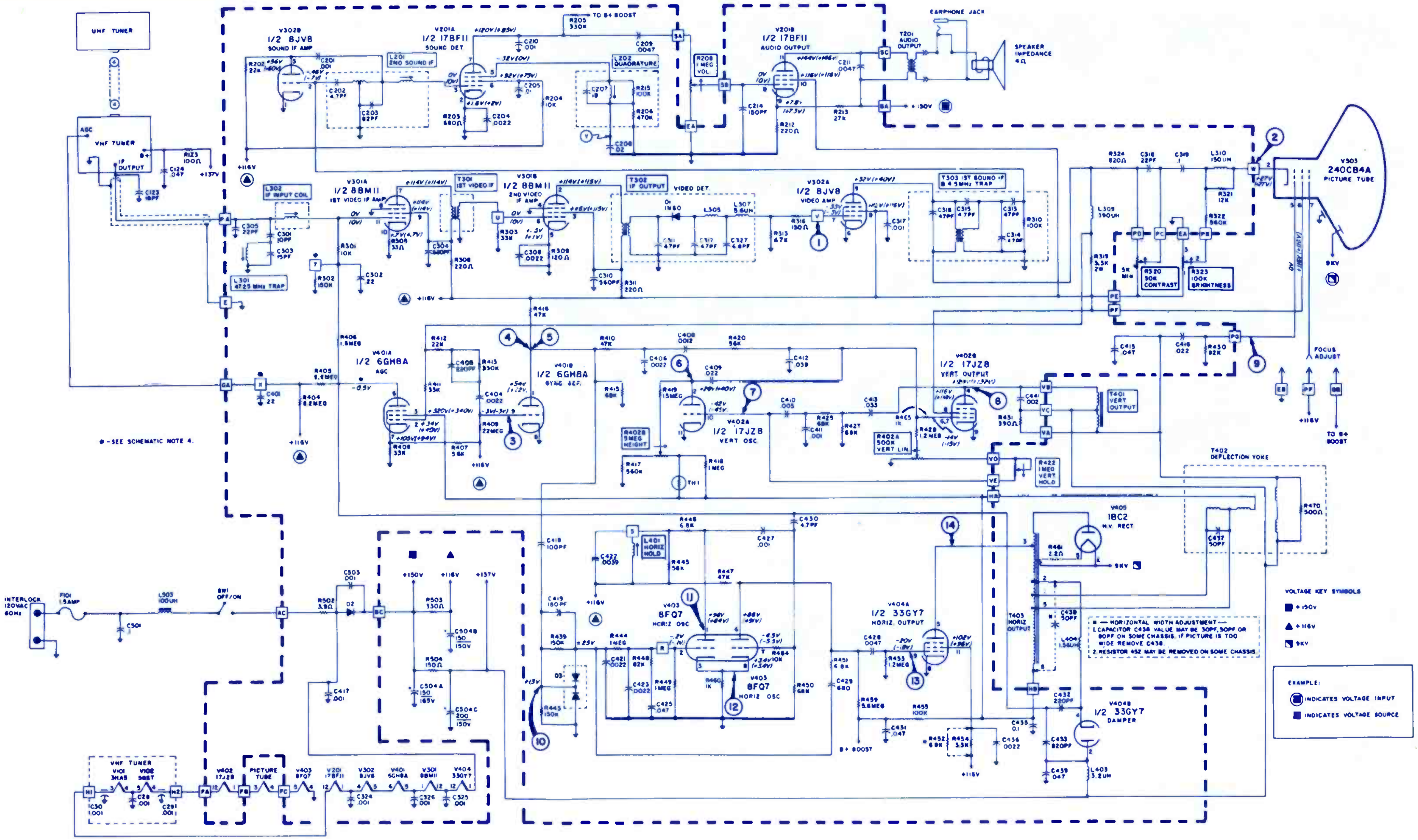
TEKFAX

COMPLETE MANUFACTURER'S' CIRCUIT DIAGRAMS AND TECHNICAL INFORMATION FOR 5 NEW SETS

GROUP 224



SYMBOL DESCRIPTION	SYLVANIA PART NO.
C504A—150/165v electrolytic	41-31041-2
C504B—150/150v electrolytic	41-31041-2
C504C—200/150v electrolytic	41-31041-2
R502—3.9-5w WW resistor	36-31036-2
R503—330-5w WW resistor	36-31036-4
R504—150-5w WW resistor	36-31036-3
TH1—thermistor	38-31-38-1
L202—quadrature coil	50-31050-17
L301—47.25MHz trap coil	50-31050-23
L302—1st video IF coil	50-31050-20
L309—peaking coil-390 μh	50-31050-28
L310—peaking coil-150 μh	50-31050-27
L403—filter	50-31050-18
L503—line filter	50-31050-29
T201—audio output xformer	56-31056-3
T301—1st video IF xformer	50-31050-21
T302—IF output xformer	50-31050-22
T303—1st sound IF & 4.5MHz trap	57-31057-2
T401—vert output xformer	56-31056-4
T402—deflection yoke	51-31050-2
T403—horiz output xformer	50-31050-16
R208—1M-volume	37-31037-6
R320—30K-contrast	37-31037-9
R323—100K-bright	37-31037-7
R402A—500K-vert linearity	37-31037-10
R402B—5M-height	37-31037-10
R422—1M-vert hold	37-31037-8
F101—fuse-1.5a	29-31029-2
D1—diode-video detector-1N60	50-31050-22
UHF tuner	54-31053-2
VHF tuner	54-31054-2

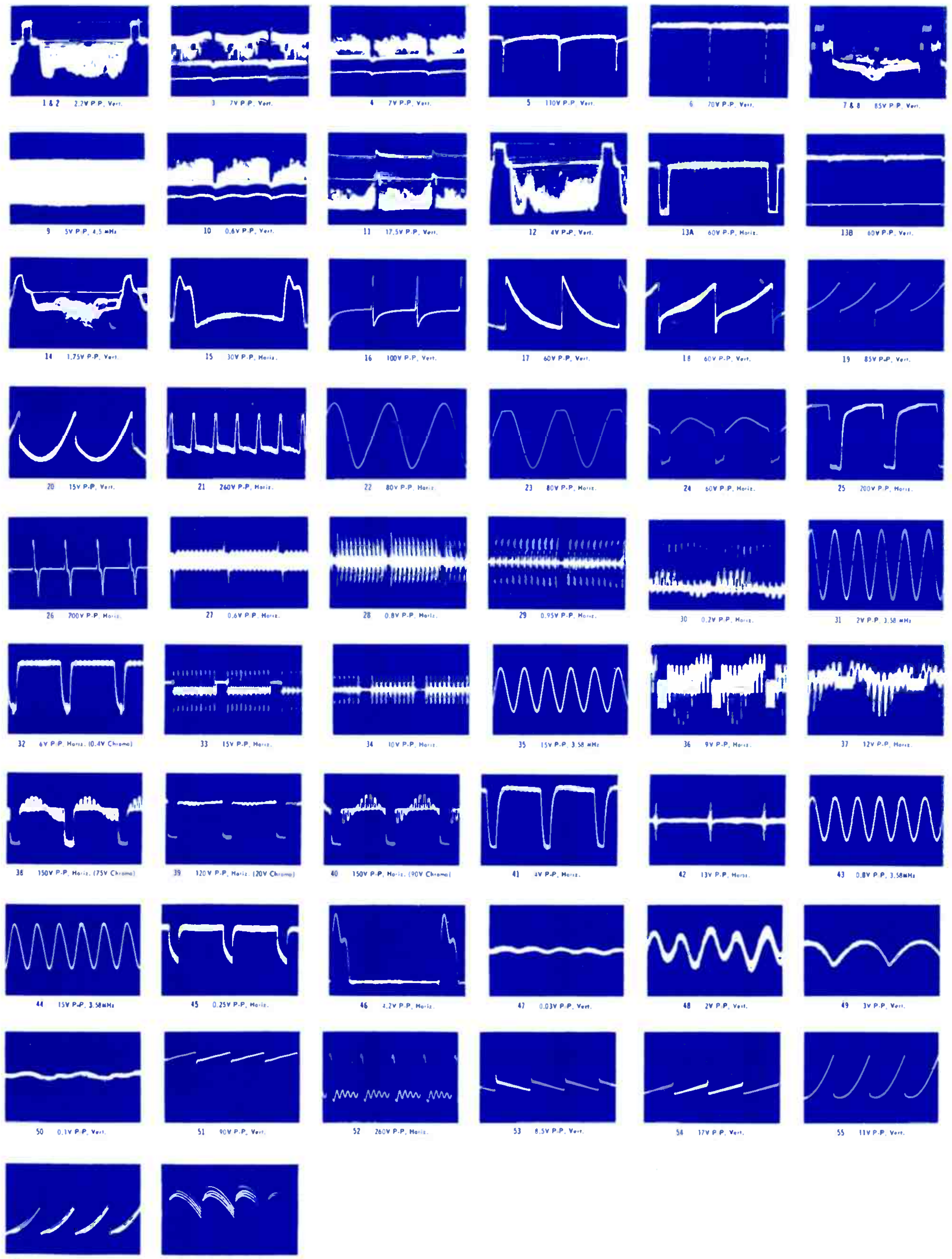


1351
ADMIRAL
Color TV Chassis
K20

APRIL • 1971

ELECTRONIC TECHNICIAN/DEALER TEKFAX

COMPLETE MANUFACTURERS' CIRCUIT DIAGRAMS AND TECHNICAL INFORMATION FOR 5 NEW SETS



1 & 2 2.2V P-P, Vert. — 3 7V P-P, Vert. — 4 7V P-P, Vert. — 5 110V P-P, Vert. — 6 70V P-P, Vert. — 7 & 8 85V P-P, Vert.

9 5V P-P, 4.5 mHz — 10 0.6V P-P, Vert. — 11 17.5V P-P, Vert. — 12 4V P-P, Vert. — 13A 60V P-P, Horiz. — 13B 60V P-P, Vert.

14 1.75V P-P, Vert. — 15 30V P-P, Horiz. — 16 100V P-P, Vert. — 17 60V P-P, Vert. — 18 60V P-P, Vert. — 19 85V P-P, Vert.

20 15V P-P, Vert. — 21 260V P-P, Horiz. — 22 80V P-P, Horiz. — 23 80V P-P, Horiz. — 24 60V P-P, Horiz. — 25 200V P-P, Horiz.

26 700V P-P, Horiz. — 27 0.6V P-P, Horiz. — 28 0.8V P-P, Horiz. — 29 0.95V P-P, Horiz. — 30 0.2V P-P, Horiz. — 31 2V P-P, 3.58 mHz

32 6V P-P, Horiz. (0.4V Chroma) — 33 15V P-P, Horiz. — 34 10V P-P, Horiz. — 35 15V P-P, 3.58 mHz — 36 9V P-P, Horiz. — 37 12V P-P, Horiz.

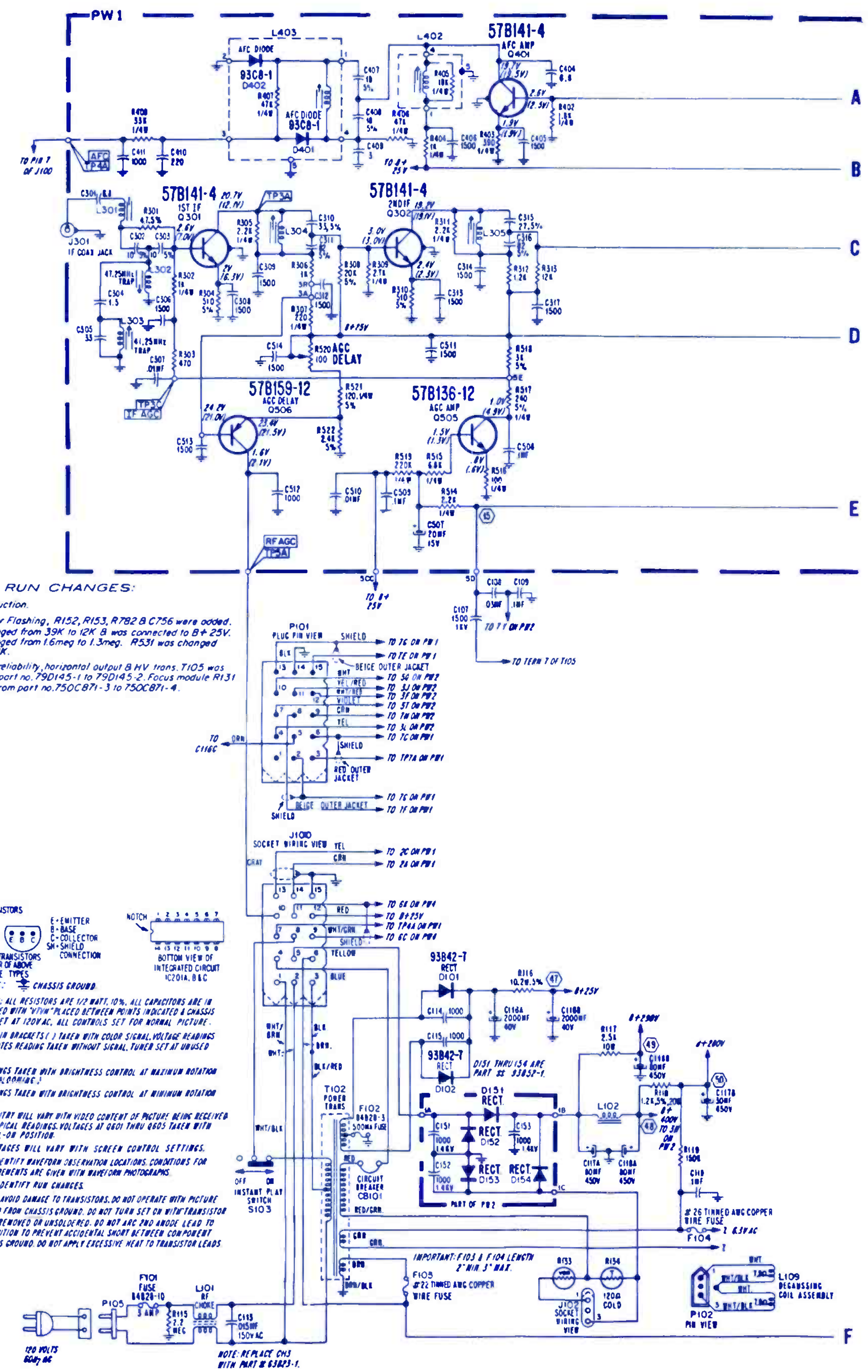
38 150V P-P, Horiz. (75V Chroma) — 39 120V P-P, Horiz. (20V Chroma) — 40 150V P-P, Horiz. (90V Chroma) — 41 4V P-P, Horiz. — 42 13V P-P, Horiz. — 43 0.8V P-P, 3.58mHz

44 15V P-P, 3.58mHz — 45 0.25V P-P, Horiz. — 46 4.2V P-P, Horiz. — 47 0.03V P-P, Vert. — 48 2V P-P, Vert. — 49 3V P-P, Vert.

50 0.1V P-P, Vert. — 51 90V P-P, Vert. — 52 260V P-P, Horiz. — 53 8.5V P-P, Vert. — 54 37V P-P, Vert. — 55 11V P-P, Vert.

56 Scope Gnd. on 8T 4V P-P, Vert. — 57 Scope Gnd. on 8T 3V P-P, Vert.

SYMBOL DESCRIPTION	ADMIRAL PART NO.
R108—2K, AGC control	75A110-11
R110—3.4M, vert size control	75A96-20
R121—500Ω, PC control	75A110-12
R123—10Ω, vert centering	75A64-37
R124—10Ω, horiz centering	75A64-30
R131—focus module	700A871-4
R132—15M, focus control	75A108-2
R133—voltage dependent resistor	61A46-8
R134—thermistor 120Ω, cold	61A49-3
R152—500K, color treshold control	75A135-23
R330—200K bright limit	75A95-15
R342—6K green drive	75A95-15
R549—8K, HV adjustment control	75A64-41
R562—300K, vert, linearity control	75A101-10
C116A—2000 µf, 40v electrolytic	67A15-401
C116B—2000 µf, 40v electrolytic	67A15-401
C116C—50 µf, 40v electrolytic	67A15-401
C117A—80 µf, 450v electrolytic	67A15-398



RUN CHANGES:

(10) Start of production.

(11) To prevent Color Flashing, R152, R153, R782 & C756 were added. R724 was changed from 39K to 12K & was connected to B+ 25V. R525 was changed from 1.6meg to 1.3meg. R531 was changed from 12K to 22K.

(12) For improved reliability, horizontal output & HV trans. T105 was changed from part no. 79D145-1 to 79D145-2. Focus module R131 was changed from part no. 750C871-3 to 750C871-4.

BOTTOM VIEW OF TRANSISTORS

Q301, Q302, Q303, Q401 — ALL OTHER TRANSISTORS ARE EITHER OF ABOVE ALTERNATE TYPES

E-EMITTER
B-BASE
C-COLLECTOR
SH-SHIELD CONNECTION

BOTTOM VIEW OF INTEGRATED CIRCUIT IC201A, B & C

SCHEMATIC NOTES: CHASSIS GROUND

UNLESS OTHERWISE NOTED: ALL RESISTORS ARE 1/2 WATT, 10%. ALL CAPACITORS ARE IN PF. DC VOLTAGES MEASURED WITH "VTVM" PLACED BETWEEN POINTS INDICATED & CHASSIS GROUND. LINE VOLTAGE SET AT 120V AC. ALL CONTROLS SET FOR NORMAL PICTURE.

VOLTAGE READINGS SHOWN IN BRACKETS ( ) TAKEN WITH COLOR SIGNAL. VOLTAGE READINGS WITHOUT BRACKETS, INDICATES READING TAKEN WITHOUT SIGNAL. TUNER SET AT UNUSED CHANNEL.

\# INDICATES VOLTAGE READINGS TAKEN WITH BRIGHTNESS CONTROL AT MAXIMUM ROTATION (FULLY CW, BUT BELOW BLOOMING.)

§ INDICATES VOLTAGE READINGS TAKEN WITH BRIGHTNESS CONTROL AT MINIMUM ROTATION (FULLY CCW)

VOLTAGES IN VIDEO CIRCUITRY WILL VARY WITH VIDEO CONTENT OF PICTURE BEING RECEIVED. VOLTAGES SHOWN ARE TYPICAL READINGS. VOLTAGES AT Q601 THRU Q605 TAKEN WITH COLOR MONITOR IN FULL-ON POSITION.

+ INDICATES THESE VOLTAGES WILL VARY WITH SCREEN CONTROL SETTINGS.

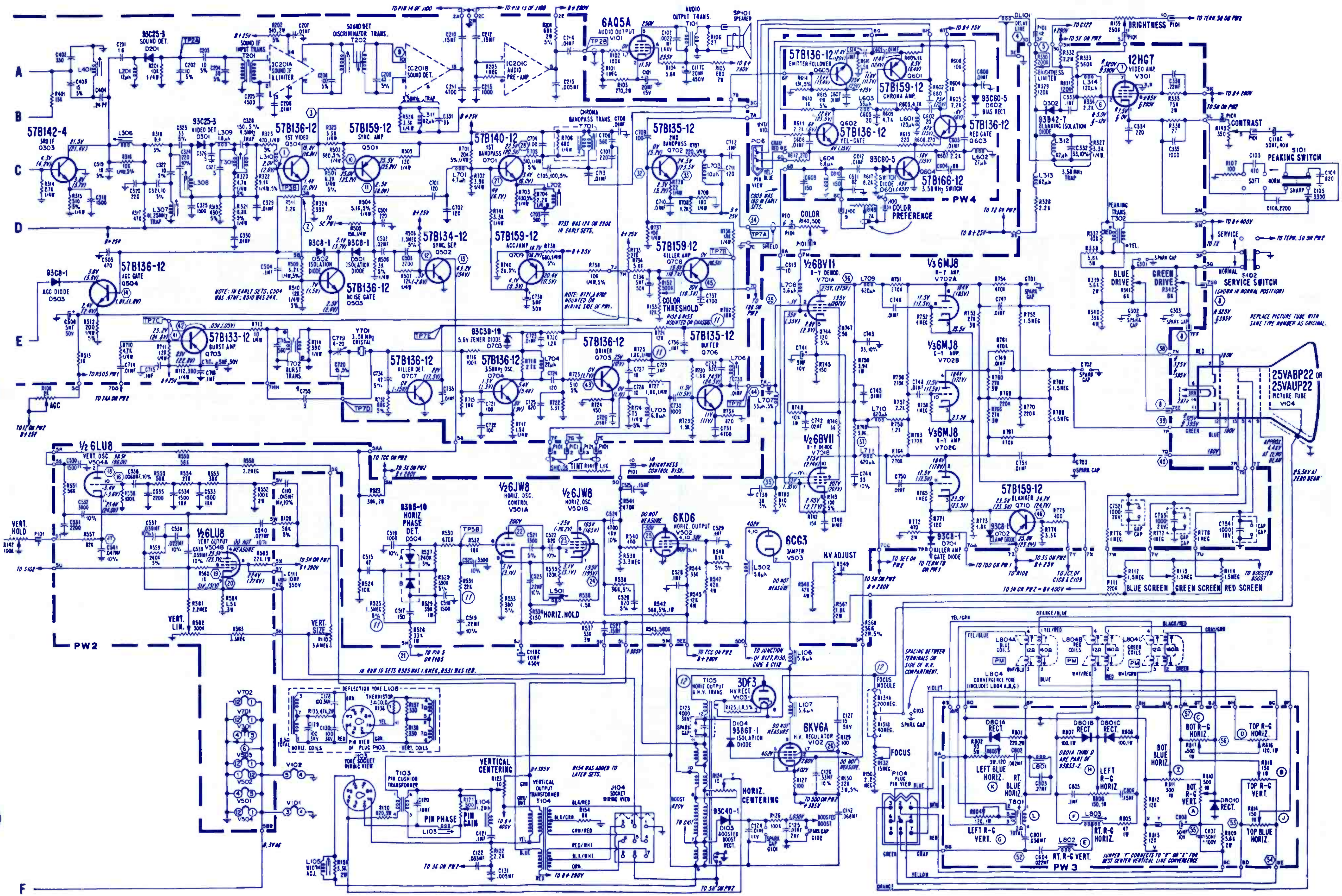
NUMBERS IN HEXAGONS IDENTIFY WAVEFORM OBSERVATION LOCATIONS. CONDITIONS FOR TAKING WAVEFORM MEASUREMENTS ARE GIVEN WITH WAVEFORM PHOTOGRAPHS.

NUMBERS IN CIRCLES IDENTIFY RUN CHANGES.

TRANSISTOR CAUTION: TO AVOID DAMAGE TO TRANSISTORS, DO NOT OPERATE WITH PICTURE TUBE DAG DISCONNECTED FROM CHASSIS GROUND. DO NOT TURN SET ON WITH TRANSISTOR (S) TUBE (S) OR LEADS REMOVED OR UNSOLDERED. DO NOT ARC 2ND ANODE LEAD TO CHASSIS GROUND. USE CAUTION TO PREVENT ACCIDENTAL SHORT BETWEEN COMPONENT TERMINALS OR TO CHASSIS GROUND. DO NOT APPLY EXCESSIVE HEAT TO TRANSISTOR LEADS.

C117B–30µf, 350v electrolytic	67A15-398
C117C–20µf, 450v electrolytic	67A15-398
C118A–80µf, 450v electrolytic	67A15-399
C118B–80µf, 450v electrolytic	67A15-399
C118C–10µf, 450v electrolytic	67A15-399
L501–horiz osc coil	94A35-1
T101–xformer, audio	79A142-1
T102–xformer, power	80A106-1
T103–xformer, p c	79A143-2
T104–xformer, vert output	79A134-2
T105–xformer, horiz output	79A145-2
T102–burst xformer	72A325-2
DL101–delay line	72A217-3
IC201A–integrated circuit	57A29-2
IC201B–integrated circuit	57A29-2
IC201C–integrated circuit	57A29-2
CB101–circuit breaker	84A17-14

ADMIRAL
Color TV Chassis
K20



1352
EMERSON
Color TV Chassis
120974B

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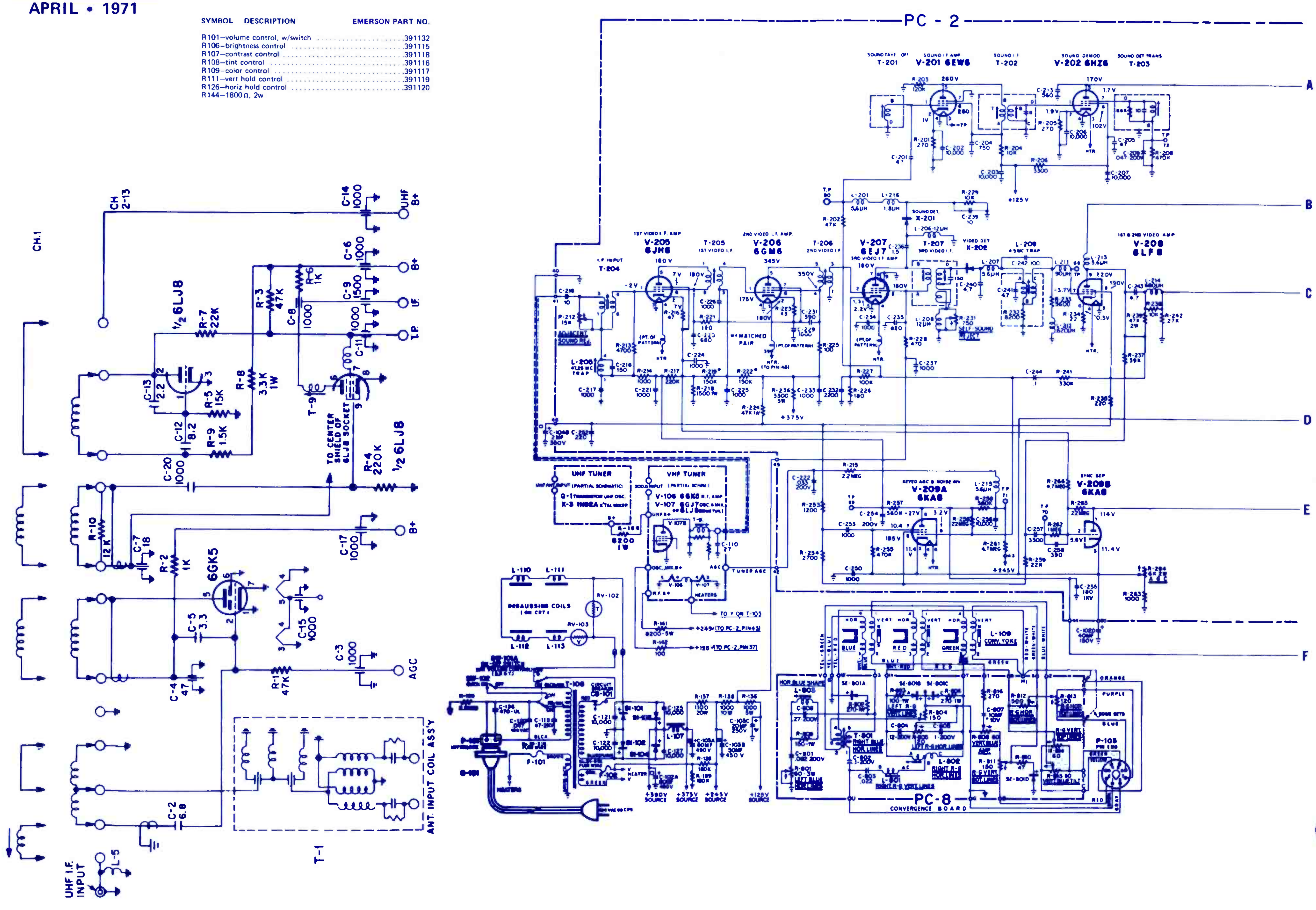
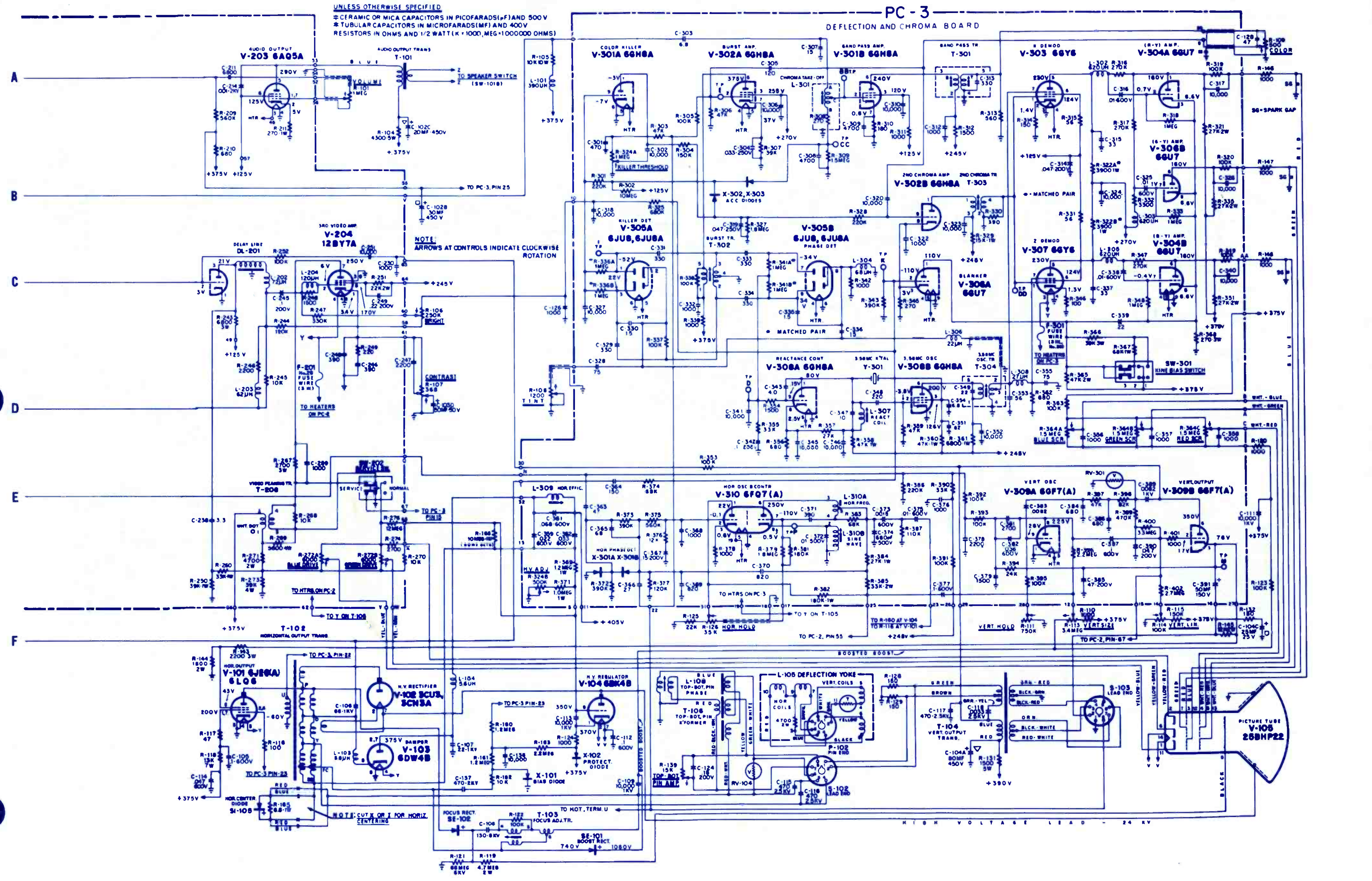
ELECTRONIC TECHNICIAN/DEALER TEKFAX

COMPLETE MANUFACTURERS' CIRCUIT DIAGRAMS AND TECHNICAL INFORMATION FOR 5 NEW SETS

SYMBOL	DESCRIPTION	EMERSON PART NO.
R101	volume control, w/switch	391132
R106	brightness control	391115
R107	contrast control	391118
R108	tint control	391116
R109	color control	391117
R111	vert hold control	391119
R126	horiz hold control	391120
R144	1800Ω, 2w	



EMERSON
Color TV Chassis
120974B



1353

GENERAL ELECTRIC

Color TV Chassis C-1

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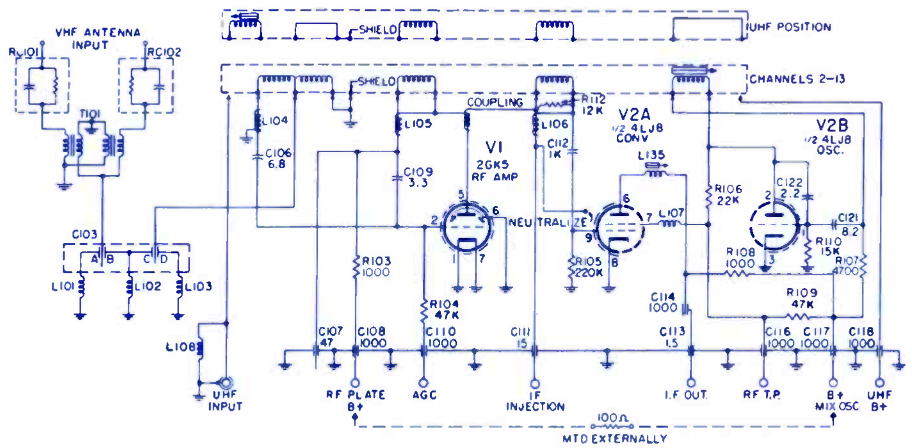
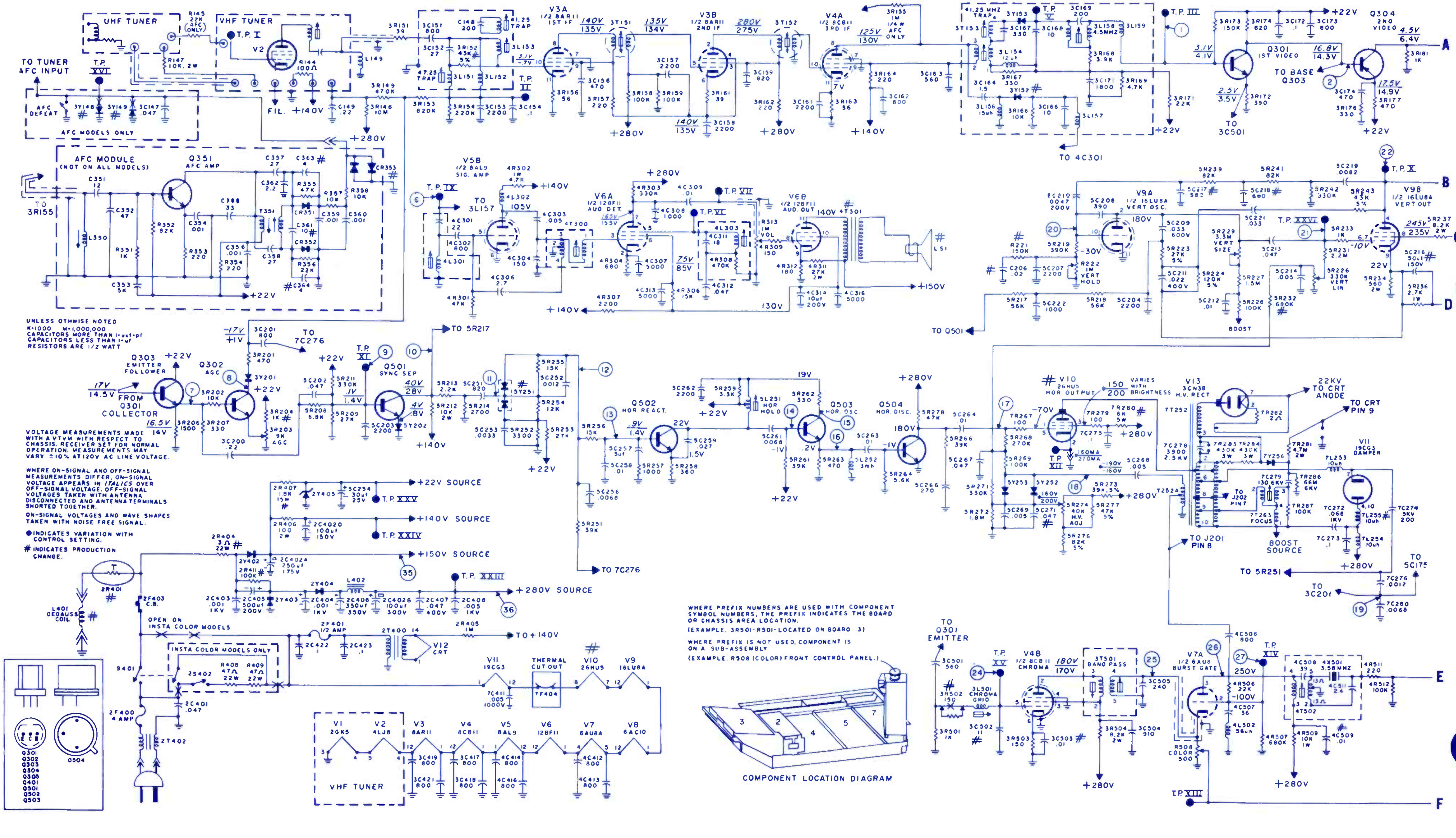
ELECTRONIC TECHNICIAN/DEALER TEKFAX

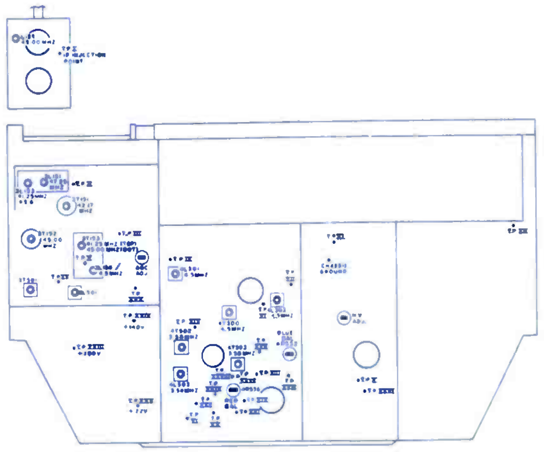
COMPLETE MANUFACTURERS' CIRCUIT DIAGRAMS AND TECHNICAL INFORMATION FOR 5 NEW SETS

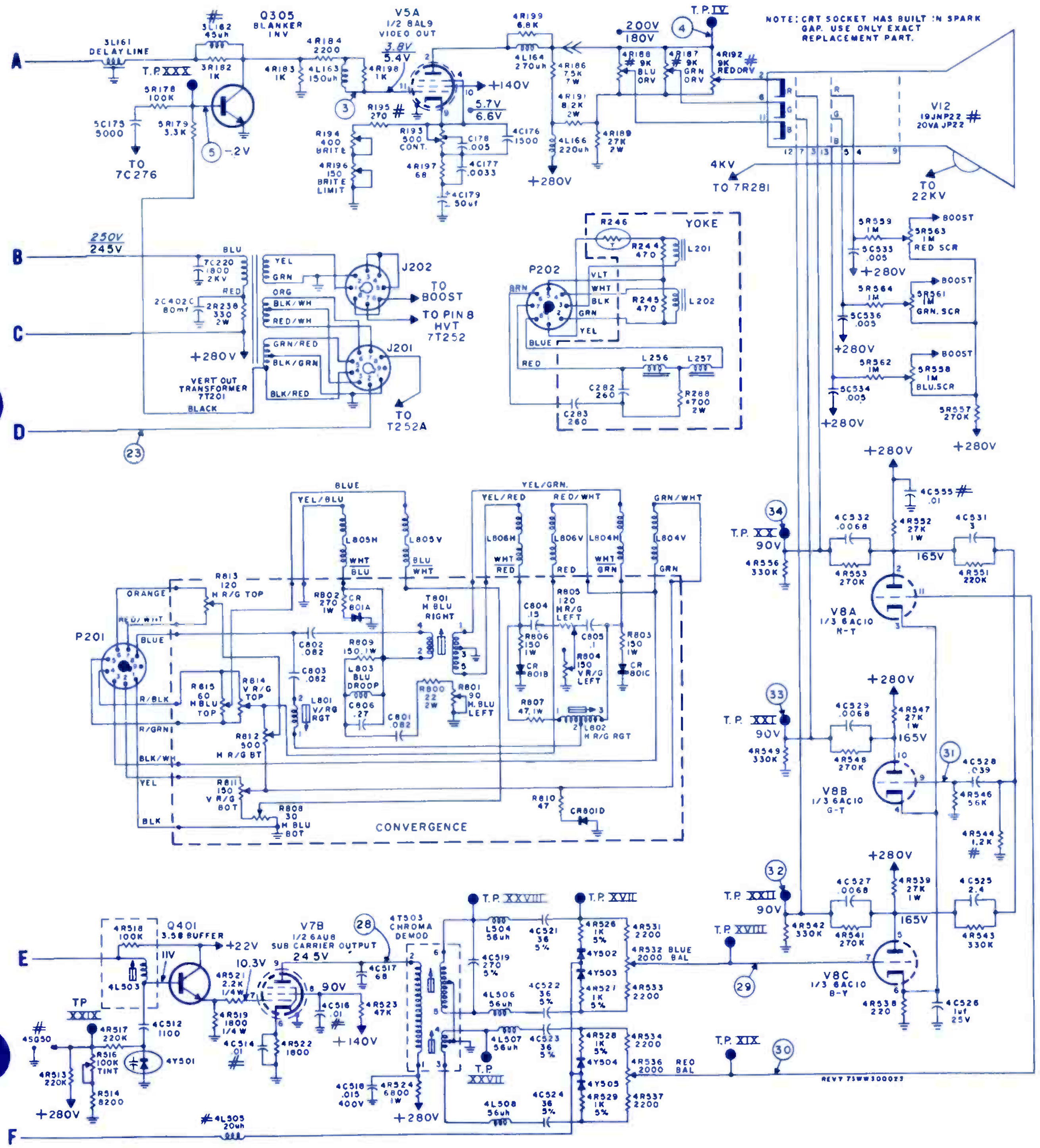
SYMBOL DESCRIPTION	GENERAL ELECTRIC PART NO.
R186–7.5K, ±10%, 7w, WW resistor	EP14X11
R401–VDR, 20%, 20v, 67ma	EU14X196
R403–thermistor, 100Ω, 25%/25°C	EP14X10
R404–2Ω, 20%, 10w, WW	EP14X9
R407–2.2K, 10%, 15w, WW	EP14X8
R408–47Ω, 10%, 22w, WW	EP14X16
R409–47Ω, 10%, 22w, WW	EP14X16
R246–thermistor, 3.8Ω /25°C	EU14X147
R193–500Ω, 30%, (tapped) contrast	EP49X39
R194–400Ω, 30%, bright	EP49X38
R196–150Ω, 20%, bright limit	EP49X28
R203–9K, 20%, AGC adj	EP49X27
R222–1M, 20%, vert hold	EP49X40
R226–330K, 30%, vert lin	EP49X31
R229–3.3M, 30%, height	EP49X31
R274–40K, 10%, HV adj	EP49X32
R313–1M, 30% volume & mtg nut w/ SPST switch	EP49X34
R508–500Ω, 20% color	EP49X37
R516–100K, 30% tint	EP49X36
R532–2K, 20% blue bal	EP49X29
R536–2K, 20% red bal	EP49X29
R558–1M, blue screen	EP49X33
R561–1M, green screen	EP49X33
R563–1M, red screen	EP49X33
C402A–250 μf, 175v elect	EP31X1
C402B–100 μf, 300v elect	EP31X1
C402C–80 μf, 300v elect	EP31X1
C402D–100 μf, 150v elect	EP31X1
Y256–rectifier, focus 3ma	EU57X32
Y501–varicap	EU30X87
L161–delay line	EP36X12
L251–coil, horiz osc	EP35X2
L301–coil, audio take off, w/core	EP36X28
L303–coil, quad, w/core	EP36X30
L506–choke, 56 μh	EP36X33
T153–xformer, vid det, 3rd IF plate, w/core	EP61X6
T201–xformer, vert output	EP64X6
T252–xformer, horiz sweep (HVT)	EP77X1
T263–coil, focus	EP36X36
T300–xformer, audio interstage, w/core	EP36X34
T301–xformer, audio output	EP64X4
T501–xformer, chroma bandpass w/core	EP61X173
T503–xformer, chroma, demodulator, w/core	EP61X175
fuse, 0.5a, fast blow (F401)	EP10X3
thermal cut out (F404)	EP10X6
UHF tuner	EP85X2
VHF tuner, 13 position, manual	EP86X1
yoke, deflection	EP76X2
yoke, convergence (complete)	EU62X287

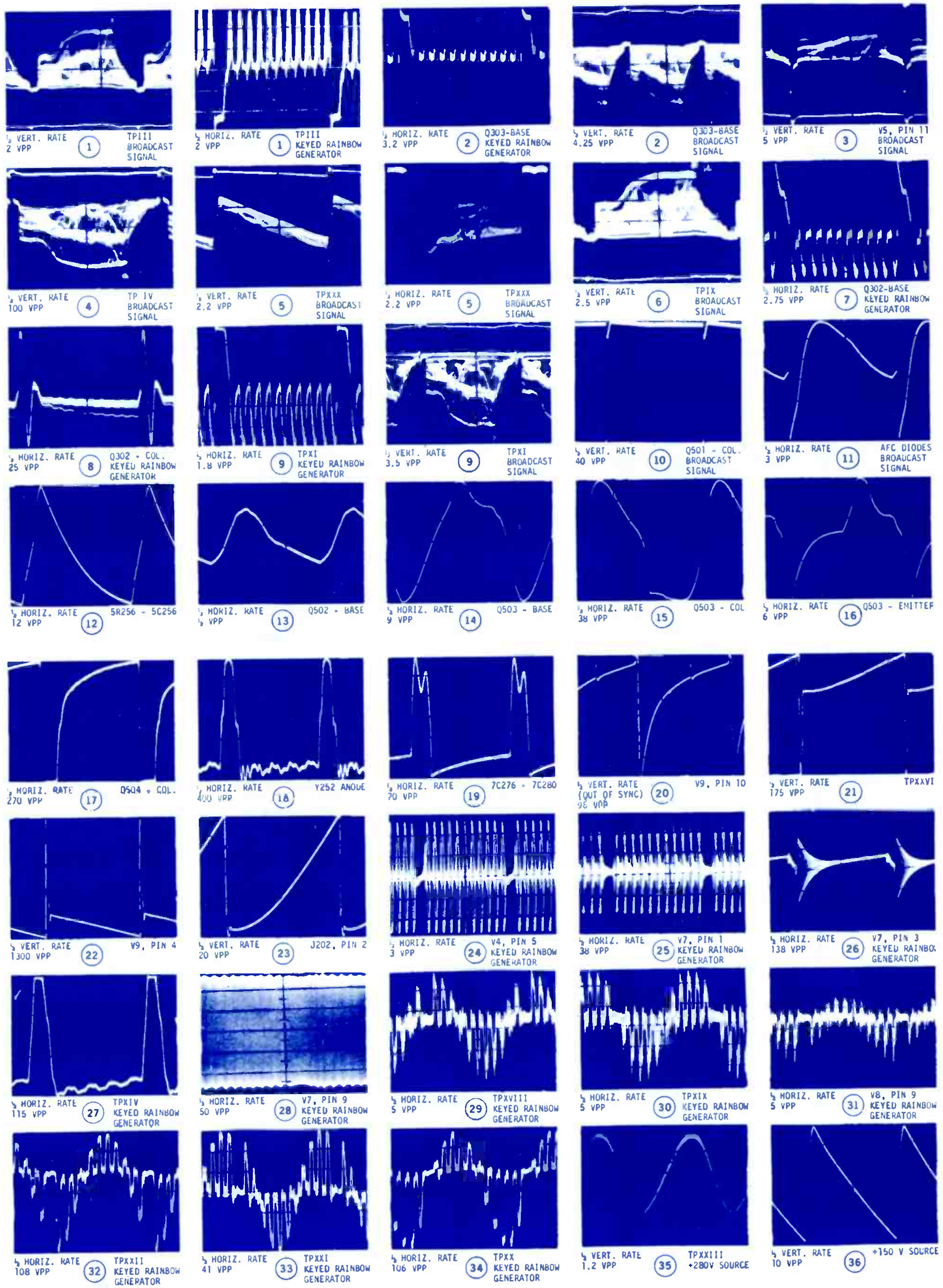




GENERAL ELECTRIC
Color TV Chassis
C-1







1354

AIRLINE

TV Model
GEN-11961A

APRIL • 1971

ELECTRONIC TECHNICIAN/DEALER TEKFAX

COMPLETE MANUFACTURERS' CIRCUIT DIAGRAMS AND TECHNICAL INFORMATION FOR 5 NEW SETS

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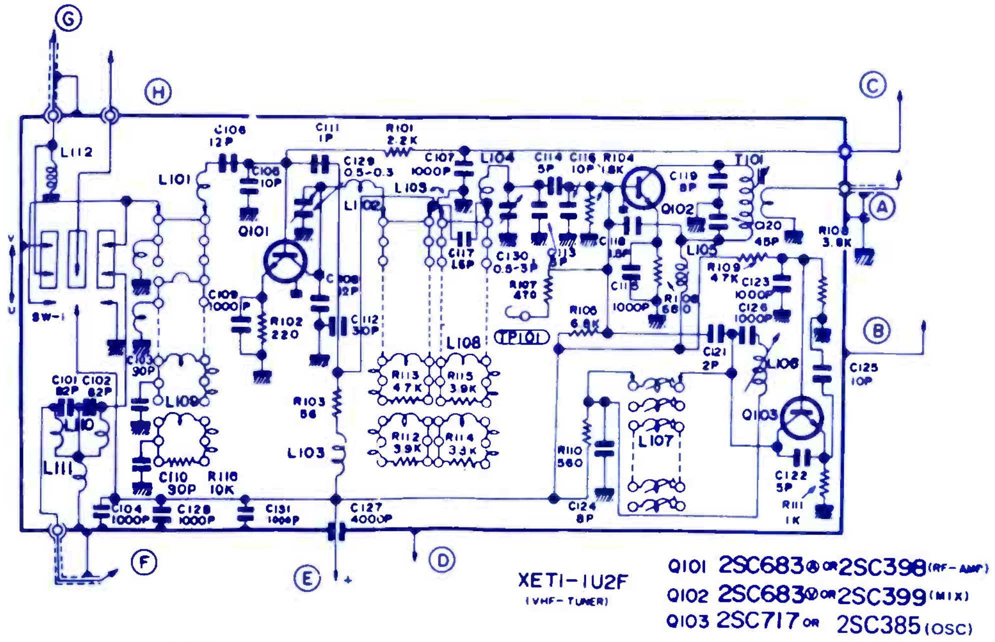
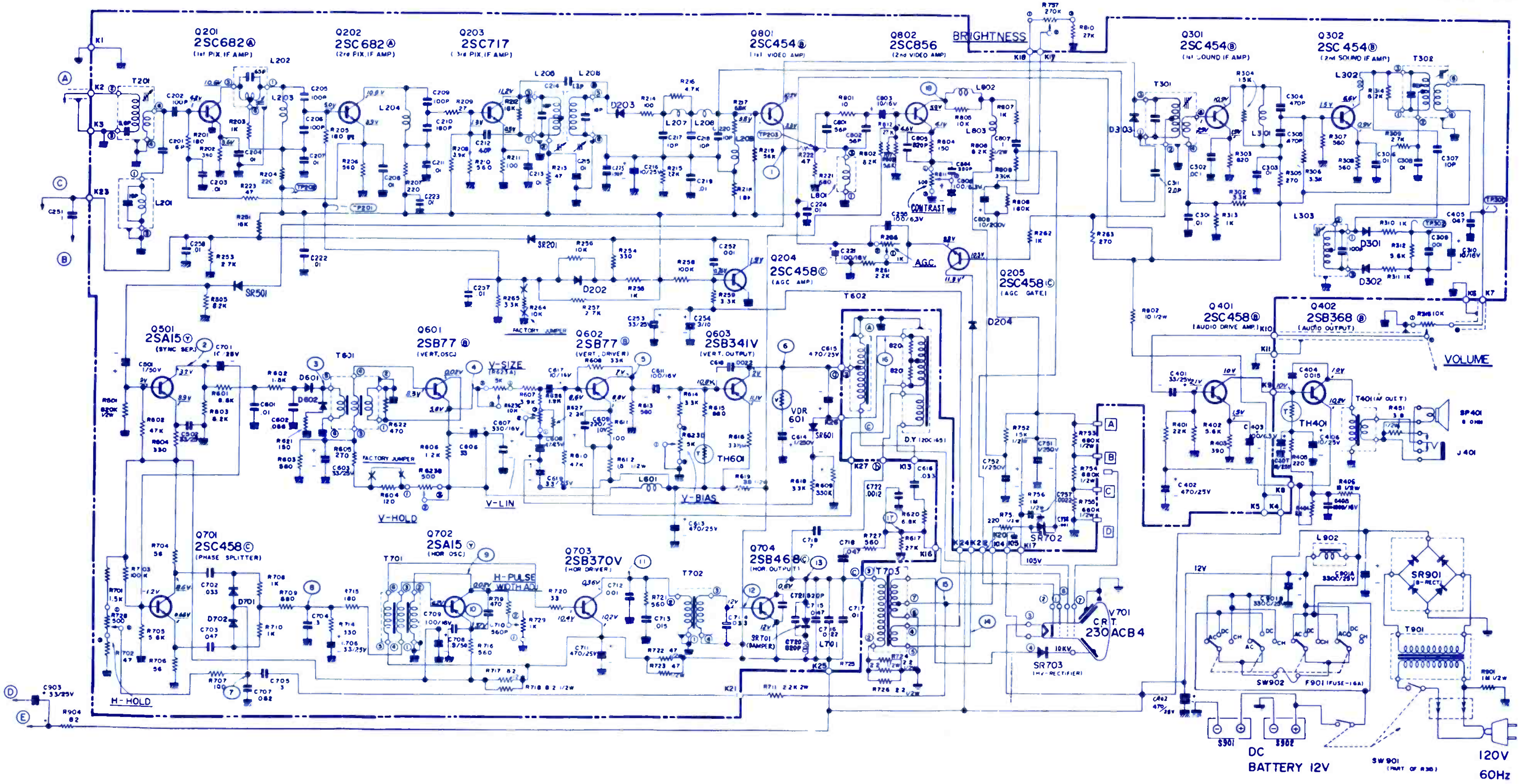
SYMBOL DESCRIPTION	AIRLINE PART NO.
C606—33 µf special electrolytic	TV32427
C901A—3300 µf/25v electrolytic	TV32432
C901B—3300 µf/25v electrolytic	TV32432
R266—1K, pot, AGC	TV25328
R315, SW901—10K, pot, on-off/volume	TV25316
R623A—5Kpot, vert size, vert hold, vert lin, vert bias	TV25317
R623B—500Ω pot, vert size, vert hold, vert lin, vert bias	TV25317
R623C—10K pot, vert size, vert hold, vert lin, vert bias	TV25317
R623D—5K pot, vert size, vert hold, vert lin, vert bias	TV25317
R728—500Ω, pot, horiz hold	TV25318
R729—1K, pot, horiz width	TV25328
R757—270K, pot, bright	TV2573
R811—500 Ω, pot, contrast	TV25319
L301—coil, sound IF	TV61606
L303—coil, sound detector	TV62438
L801—coil, 4.5MHz trap	TV62258
L902—coil, power choke	TV61611
T401—xformer, sound output	TV11257
T601—xformer, vert oscillator	TV11258
T602—xformer, vert output	TV11169
T701—xformer, horiz osc	TV11133
T702—xformer, horiz driver	TV11259
T703—xformer, horiz output w/½ h v rect bracket	TV11260
T901—xformer, power	TV11261
D202—diode, 1N34A, AGC delay	1N34A
D203—diode, 1N60, picture detector	1N60
SR601—rectifier, vert lin	TV24648
TH401—thermistor, audio circuit	TV24249
TH601—thermistor, vert circuit	TV24249
VDR601—voltage dependent resistor	TV24250
fuse, 1.6a	31501.6
UHF tuner	TV35351
VHF tuner	TV35183
yoke, deflection (assembly, w/leads)	TV61612





ELECTRONIC
TECHNICIAN/DEALER

APRIL 1971 • VOLUME 93 NUMBER 4

This month's cover shows the final testing of EICO's Cortina-2 stereo receiver. The test instruments employed by the final test inspector are part of EICO's line of laboratory-precision instruments.

FEATURES

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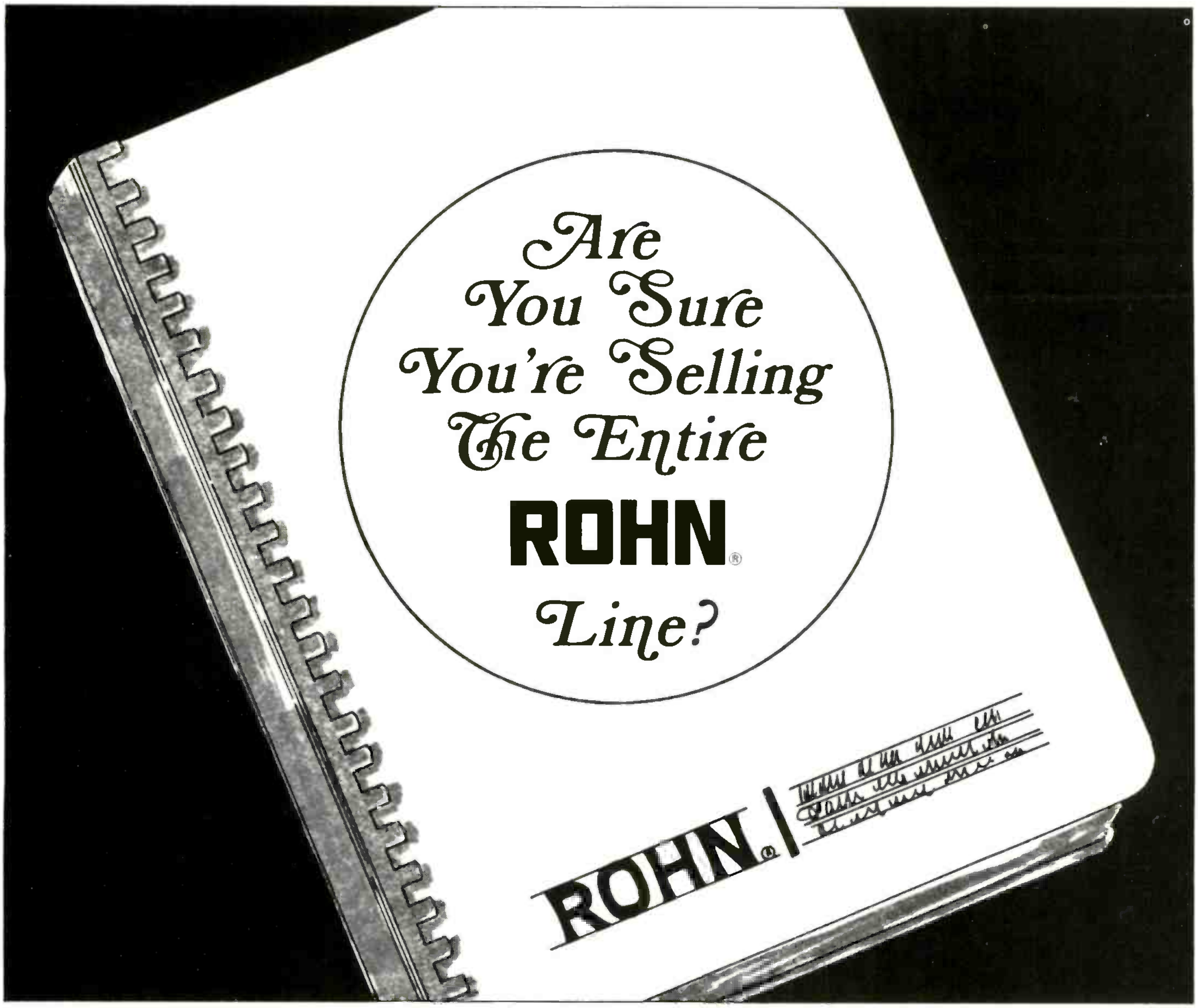

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EDITORIAL

Improving the TV Image

Last month's memo discussed increased industry awareness of the importance of the electronic technician to the electronics industry. Of what value is electronic equipment if it cannot be kept in operating condition.

Another subject of extreme interest to the Electronics Industry Council was "vintage reception systems."

An extremely strong consumer protection law is currently either "in the works" or "on the books" in California. Under this law, if after 30 days of purchase a customer is dissatisfied with his TV set he can either demand a replacement or a full refund. How can you assure customer satisfaction in California, or elsewhere, if the signal fed the TV set is either too weak or contains significant interference.

Robert W. Flanders, Director of Engineering, Time-Life Broadcast, Inc., reported to the Council that they have done a great deal of research concerning TV interference encountered in many cities on Channel 6 (and in some other cities to a lesser extent on Channel 13). The basic problem results from the frequencies assigned this channel. It falls in a portion of the radio spectrum where many TV sets and antennas are less effective. And it is here that problems more frequently develop from FM station interference.

We were advised that if you experience difficulty receiving Channel 6, do not blame the TV station. It is very unlikely that it is not responsible for the problem. Instead, check the location and condition of the TV-set antenna, and look for possible FM station interference.

Mr. Flanders told us that in one part of Indiana FM interference was being radiated over several city blocks. Although nearer the FM station than the TV station, this area was not in the immediate vicinity of the FM station. After tracking the interference down with a portable unit, they discovered that it was radiating from a preamplifier on the antenna of a private residence. This signal continued to radiate on Channel 6 even after the amplifier was disconnected from the power source! No FM trap could eliminate this radiation from adjacent TV sets since it was received within the Channel 6 portion of the spectrum rather than at the frequency of the FM station indirectly supplying the RF energy.

Some of this problem results from the allocation of particular FM Band frequencies by the FCC. The Council recommended that in areas where TV interference by FM stations is prevalent, frequent complaints should be sent to the FCC even though the FM station transmitter is operating according to FCC specifications.

The various representatives of the broadcast industry present at the meeting indicated that TV stations are definitely interested in the receivability of their signals. The more TV sets that can satisfactorily receive their signal, the more viewers they have.

We were told of one UHF TV station that regularly promoted the installation of adequate antennas for effective reception. It was mentioned that despite that station's promotion of the services offered by local dealers and technicians, no active cooperation was received from them—despite the frequent prodding of one antenna manufacturer.

The meeting dwelt on the fact that good antennas are a **must** for good reception—individual TV set and MATV system. It was felt that all old antennas should be replaced, and that a special nationwide antenna program should be started by the electronics industry as a whole to promote good TV reception.

Although an electronic technician can use a field-strength meter to determine the output of the old antenna, decibel readings mean little to the average customer. The Council therefore decided to begin a study to prove the difference in reception between old and new antennas—a report to be given at their next meeting.

Based on the expected results of that study, the group believes that it would be possible to begin a program that would guarantee the customer significantly better pictures on his TV set with the new antenna, or it would be removed and the old one again connected at no cost to the customer.

The rest of the electronics industry seems anxious to see that you are effectively selling and servicing TV antennas to provide better TV reception.

Phillip Dahlen

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LETTERS

Reader comments concerning past feature articles, Editor's Memos, previous reader responses or other subjects of interest to the industry.

Make Marine Servicing Easier

I have been a subscriber for several years and like your publication. However, I would like to see more information on the testing and repair of Depth Finders and Fish Locators. In this area, near Lake Texoma, there are many of these units that need servicing and I am sure that it is a major business in many resort areas, just as it is at this location.

Could you supply me with the name and address of a manufacturer or distributor of small transducers for depth finders? I service many makes, finding that those experiencing a failure while here on vacation do not have time to send their units to the manufacturer for repair. In many cases, I can have these units back in service in a short time, but for some I have to await parts from a factory or get a letter back saying that the unit should be sent back for repair. This proves to be a great delay as well as expense for some. I find that the factories are very uncooperative—however, some do send a schematic for a specific model, but that's about all. No service data is available.

They hurt their own sales by not making reliable service quickly available to their customers. It is ridiculous for them to feel that they are the only ones qualified to service these units. What if all TV and radio manufacturers felt this way.

I am a retired electronic engineer and know that I am as qualified as their personnel. There are many others like myself. We do need to have parts available and we would prefer to test and maintain these units according to factory recommendations—if they would give us this information. If not, we must do it our own way.

Any help you may give will be appreciated by myself and others.

Ray K. Bryan

Are there others in electronic servicing faced with this problem? If so, we would appreciate hearing from you. We would also appreciate hearing from the manufacturers and distributors of depth finders and fish locators.
Ed.

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NEWS OF THE INDUSTRY

Two Dallas Meetings Both Prove Exciting

The National Electronics Service Conference, with 30 major manufacturers represented, as well as distributors and service companies from all parts of the United States, meeting in small table groupings to discuss four major topics, drew 131 persons at the Hilton Inn, Dallas, Texas on February 11th.

The previous day the Electronics Industry Council, with 11 major trade associations participating, or with official observers in attendance, activated nine working committees and task forces to deal with many problems facing the industry and to recommend effective steps to correct or alleviate them.

The Service Conference, under the chairmanship of Gail S. Carter, executive vice president of NEDA and cosponsored by the National Electronic Associations, the National Alliance of Television-Electronics Service Associations, the Distributor Products Div. of the Electronics Industries Association, the Electronic Representatives Association and NEDA, exceeded even the most optimistic expectations of the participants—many of whom traveled from storm ridden northern states as well as areas of the California earthquake. An official observer from a Japanese trade association was also present.

An extra added attraction was a talk at the Service Conference luncheon by Jim Bishop, deputy director of the Washington Bureau of NEWSWEEK on "Consumerism and Producerism, the Two Sides of the Public's Dollar."

For the stated purpose of "pinpointing solutions to the electronic industry's service problems through joint effort of representative segments of all of the industry," four groupings of three tables each were set up in the Hilton Inn grand ballroom to discuss Education and Training, Serviceability, Parts Availability and Technical Information. Each table had a leader, who acted as spokesmen when the groupings from the three tables met to summarize their discussions. At the afternoon session, the entire group met in a general assembly, at which a report was made for each of the four subjects.

At the Electronics Industry Council meeting, under the chairmanship of Gene Hill of Kaiser Broadcasting, subjects ranging from parts availability to TV interference were discussed and committees appointed in coordination with Council's findings and conclusions for further dissemination and action.

Bill Woodbury of Sprague Products led the discussion on parts availability. Tom Surber of Howard W. Sams, who succeeds Woodbury as EIA distributor division representative on the Council, was named chairman of the committee to carry through on the findings of NEDA, NEA, NATESA and ERA on this problem.

Don Martin of Associated Publications was named chairman of a committee to explore further the plan to expand the scope of the Electronics Hall of Fame to include all segments of the industry.

M. L. Finneburgh, Sr., of Finney Co., was made chairman of a committee to explore the prospects of all-industry certification of electronic technicians.

Bob Flanders of NAB will head a committee to discuss with government agencies and others the problems of TV interference from educational FM stations.

"Concentration" during the second meeting of the Electronic Industry Council in Dallas at the Hilton Inn.

Bill Woodbury addresses the NESC joint session in Dallas.

The National Appliance Radio Dealers Association accepted an invitation to be the host for the next meeting of the National Electronics Service Conference.

S. I. Neiman of the Electronics Information Bureau was "invited to volunteer" and accepted the responsibility for publicizing the next meetings of both the Electronics Industry Council and the National Electronics Service Conference.

Both the Conference and the Council passed resolutions to thank J. W. Williams, Jr., executive director of the Texas Electronics Association, for his work in making arrangements to house and provide meeting accommodations for the participants.

At a joint meeting of the North Texas and South Texas Chapters of NEDA, John Leedom, in his capacity as chairman of the arrangements committee for the 1971 gala dinner celebration which will be a feature of the New Show June 3rd, told of plans in which all segments of the electronics industry are joining to make the dinner in Bal Harbour (Miami Beach) Fla., the focus of a salute to the Electronics Industries' Second Century of Progress.

IESA 16th Annual Convention to Be Held

The Annual 16th Spring Convention of the Indiana Electronic Service Assn. will be held April 16 through 18 at the Ramada Inn, Indianapolis, Ind. In addition to association business, the convention will include technical seminars plus a business management school. The annual IESA membership meeting will be held on the 18th.

Sylvania/Jud Williams Seminars Cover Transistor Trouble Shooting

On February 22, 1971, the Sylvania/Jud Williams seminars began its 1971 schedule. The meetings to be held will as before cover the entire United States and will involve the "hands on" approach to service training. The program will include transistor trouble shooting using a triggered scope and dynamic transistor curve tracer, and chroma circuitry adjustments using the gated rainbow signal from a color bar generator. The meetings will be held only during the day and will be limited to 25-35 dealers per meeting. They are scheduled as follows:

APRIL
12—Philadelphia, Pa.
13—Philadelphia, Pa.
14—Philadelphia, Pa.
15—Wilmington, Del.
19—Birmingham, Ala
21—Nashville, Tenn.
23—Memphis, Tenn.
28—New Orleans, La.
29—New Iberia, La.
30—Lake Charles, La.

MAY
3—Beaumont, Texas
4—Houston, Texas
6—Corpus Christi, Texas
10—San Antonio, Texas
11—Austin, Texas
13—Fort Worth, Texas
14—Dallas, Texas

JULY
9—Phoenix, Ariz.
12—San Diego, Calif.
13—San Bernardino, Calif.
14—Los Angeles, Calif.
19—Los Angeles, Calif.
20—Santa Barbara, Calif.
22—San Francisco, Calif.
23—Sacramento, Calif.
26—Portland, Oreg.
28—Seattle, Wash.

AUGUST
2—Boise, Idaho
4—Salt Lake City, Utah
5—Salt Lake City, Utah
9—Denver, Colo.
11—Omaha, Neb.
13—Des Moines, Iowa
23—Kansas City, Mo.
25—St. Louis, Mo.
27—Bloomington, Ill.
30—Hammond, Ind.
31—South Bend, Ind.

SEPTEMBER
2—Indianapolis, Ind.
7—Louisville, Ky.
8—Lexington, Ky.
10—Dayton, Ohio
20—Columbus, Ohio
21—Columbus, Ohio
23—Toledo, Ohio
24—Detroit, Mich.
27—Cleveland, Ohio
28—Cleveland, Ohio
29—Akron, Ohio
30—Youngstown, Ohio

OCTOBER
4—Batavia, N.Y.
5—Batavia, N.Y.
6—Buffalo, N.Y.
7—Rochester, N.Y.
8—Syracuse, N.Y.
18—Connecticut
19—Connecticut
20—Springfield, Mass.
21—Albany, N.Y.
22—Albany, N.Y.
25—Williamsport, Pa.
26—Altoona, Pa.
27—Winchester, Va.
28—York, Pa.
29—York, Pa.

NOVEMBER
1—Manchester, N.H.
2—Boston, Mass.
3—Boston, Mass.
4—Providence, R.I.
5—Providence, R.I.
8—Westchester City, N.Y.
9—Bronx, N.Y.
10—Nassau City, N.Y.
11—Nassau City, N.Y.
15—Brooklyn, N.Y.
16—Brooklyn, N.Y.
17—Brooklyn, N.Y.
18—Queens, N.Y.
19—Queens, N.Y.

For further information contact: Jack Berquist
Sylvania Training Center
17 Masse Place
Batavia, N.Y. 14021

Jerrold Electronics Corp. Sponsors Technical Schools

The Jerrold Electronics Corp. Technical Training Institute is scheduling basic training schools in major cities across the country. The cities were selected to form a pattern which would place any cable-TV technician in the country, at least one-time during 1971, no more than a day's drive from one of the schools. One school has already been held in Los Angeles and another in Atlanta. Other cities are tentatively scheduled.

One of the main reasons for the success of the basic training school program at Jerrold has been its universality. The schools are open to all technicians in the cable-TV field, not merely Jerrold-affiliated firms or individuals. Further, the schools are considered real learning experiences for all in the industry, not just brush-up courses.

This year's broad schedule of instruction includes an initial briefing on the history of the cable-TV industry, with a step-by-step analysis of systems used up to the present day, the evolution of modern cables and a brief discussion of the development of subscriber material. A close look at "The decibel" covers definition of terminology, reasons for use and pertinent numbers. A study of the field strength meter covers a general technical description, a look at the signal level indicator and the use of the field-strength meter as a test receiver for proof of performance.

Jerrold is sponsoring a number of two-day technical seminars and at least one two-week workshop. The two-week workshop will be by invitation only and will be held in Philadelphia.

FTC Proposes Rule Relating to Power Output of Amplifiers

The Federal Trade Commission has proposed a trade regulation regarding the advertising of power output of sound power amplification equipment for home entertainment products. The proposed rule provides that it would be an unfair method of competition and an unfair and deceptive act or practice to represent, expressly or by implication, any power output (in watts or otherwise), power band or power frequency response, or distortion capability or characteristic of sound power amplification equipment without disclosing:

- The manufacturer's rated minimum sine wave continuous rms (effective) power output in watts per channel;
- The load impedance (e.g., 4, 8, 16Ω) for which the manufacturer intends the equipment to be used;
- The rated power frequency response; and
- The rated percentage of maximum total harmonic distortion at any power level from 0w to the rated power output.

The proposed rule permits optional disclosures under certain conditions.

The rule would extend to radios, record and tape players, radio-phonograph and/or tape combinations, component audio amplifiers and the like.

Based upon information presently available, the Commission believes that the most reliable method of rating power output of amplification equipment is by its rms or continuous power output capability.

In the absence of a single industry standard, the Commission believes that the rating of power output of amplification equipment according to the rms or continuous power method will provide the consumer with a valid and meaningful basis for comparison in the marketplace.

READERS' AID

Space contributed to help serve the personal needs of you, our readers.

Needs Schematic

Can any reader help me locate a schematic for a Japanese import 4-8 track tape player, "Mars." No other information is available. Isn't it about time we pressed for stringent requirements that the manufacturers of this type of merchandise be forced to supply technical data?

CHARLES G. KARAFOTIAS
Electronics Instructor
Martin County High School
Stuart, Fla.

Can anyone help me obtain schematics, charts and supplements for an Accurate Instrument Tube Tester, Model 151?

GLENN MASOPUST
Rt. 1 Box 77
Noble, Okla.73068

Test Instruments for Sale

I have for sale the following test instruments: signal generator, volt-ohm (capacity milliameter), oscillograph, tube testers, oscilloscope, in-circuit capacitance tester, dynamic tester, variable voltage supply and battery charger.

KENNETH O. BALDWIN
1127 Bennington Drive
Sunnyvale, Calif. 94087

I have the following for sale: tube tester, high-voltage probe, in-circuit tester, circuit tracer, signal generator and substitution box. Also available are service literature and past issues of electronic publications. More information will be given on request.

ORAL H. VANNOY
Stumptown, W. Va. 25280

For Sale

I am quitting the TV business and wish to dispose of 250 tubes plus test gear and parts at best offer.

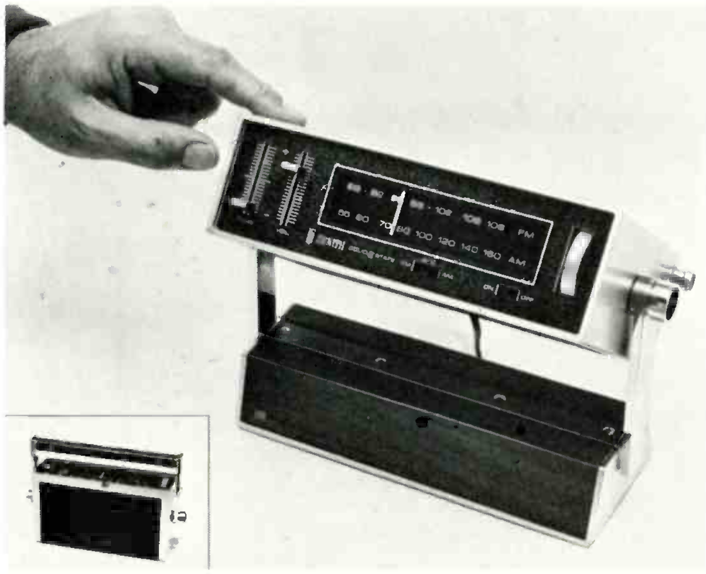
JACK MANDIK
1333 Ridge Ave.
Evanston, Ill. 60201

I have all types of old radio tubes for sale at reasonable prices. A list will be sent upon request.

G. C. GOODWIN
Goodwin Radio Shop
126 West 1st Ave.
Rankin, Ill. 60960

NEW AND NOTEWORTHY

For additional information on products described in this section, circle the numbers on Reader Service Card. Requests will be handled promptly.



FM/AM RADIO 701

Radio plays on ac power while recharging batteries

A solid-state FM/AM "Convertible" radio reportedly recharges itself while playing as a table model but goes anywhere as portable. Said to use 11 transistors, the "Convertible," Model RB-57Y, reportedly has a tilt-lock base which supports the radio on its carry-about handle and adjusts to any of three desired angles—the base containing the recharging equipment. Specifications indicate that the radio has 1000mw maximum audio output and the broadband RF stage on FM increases sensitivity to allow for reception of more stations. Station selection is made easier with the slide rule tuning, and a tone control is provided. The FM/AM model is styled in ebony and chrome colors with walnut color trim. Price $49.95. Zenith.

FOR MORE NEW PRODUCTS SEE PAGE 57

COMMUNICATIONS TRANSCEIVER 700

Features PWR/S and SWR meters on front panel

The "Cobra 25" solid-state transceiver is said to incorporate a FET mixer stage designed to eliminate cross talk. The circuitry reportedly includes ceramic filters and IC amplifiers. Exclusive "Dyna-Boost" speech compression is designed to insure sharp crisp audio. Specifications indicate a 5w input and a 4w output in addition to crystal-controlled transmitting and receiving on all 23 channels. Featured is the PWR/S meter on the front panel which is designed to indicate relative strength of received signals and relative power output of the transmitted signal. Actual power output may reportedly also be read. The SWR/Modulation meter, also on the front, is designed to read standing wave ratio and percent modulation. A microphone gain control, when used with the SWR/Modulation meter, reportedly enables the operator to match his particular voice characteristics to the transceiver and mike for best modulation. Output power and percent modulation can be monitored simultaneously the manufacturer states. Other transceiver specifications include a dual conversion superhet, switch-controlled noise limiter, AGC, and better than 50dB rejection of spurious signals. The unit may reportedly be used as a PA system with a speaker jack, front-panel volume control, and PA/CB selector switch. A jack for an external speaker is also said to be provided. The unit measures 13 in. by 5½ in. by 9 in. and weighs 11½ lb. Dynascan Corp.

FUNCTION GENERATOR 702

Operates on a frequency range of 0.1Hz to 100kHz

The Model SG-10 Function Generator is said to feature an ultra linear ramp, square wave and pulse, with adjustable pulse width from 0 to 100% duty cycle. Specifications indicate a frequency range of 0.1Hz to 100kHz with variable amplitude control; a variable pulse width, with a rise time less than 200μs; and continuously variable frequency control. Price $69.95. Blulyne Electronics.

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To start your Membership on these attractive terms, simply fill out and mail the postage-paid airmail card today. You will receive the three books of your choice for 10-day inspection. SEND NO MONEY! If you are not delighted, return them within 10 days and your Trial Membership will be cancelled without cost or obligation. Electronics Book Club, Blue Ridge Summit, Pa. 17214.

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- **Zenith Color TV Service Manual—Vol. 2** — List Price $7.95; Club Price $4.95
- **Transistor Projects for Hobbyists & Students** — List Price $7.95; Club Price $4.95
- **Philco Monochrome TV Service Manual** — List Price $7.95; Club Price $4.95
- **Electronic Musical Instruments** — List Price $7.95; Club Price $4.95
- **Electronic Designer's Handbook** — List Price $9.95; Club Price $5.95
- **Dictionary of Electronics** — List Price $6.95; Club Price $5.50
- **Computer Circuits & How They Work** — List Price $7.95; Club Price $4.95
- **Commercial Radio Operator's License Study Guide** — List Price $7.50; Club Price $5.95
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- **Electronic Test & Measurement Handbook** — List Price $7.95; Club Price $4.95
- **Pulse & Switching Circuits** — List Price $7.95; Club Price $4.95
- **Circuit Consultant's Casebook** — List Price $9.95; Club Price $5.95
- **How to Use Vectorscope-Oscilloscopes & Sweep-Marker Generators** — List Price $7.95; Club Price $4.95
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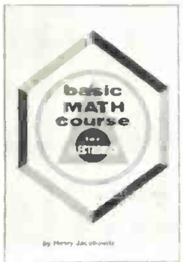
- **Handbook of Magnetic Recording** — List Price $7.95; Club Price $4.95
- **125 One-Transistor Projects** — List Price $7.95; Club Price $4.95
- **Computer Architecture** — List Price $12.50; Club Price $8.95
- **Servicing Modern Hi-Fi Stereo Systems** — List Price $7.95; Club Price $4.95

AN EXTRAORDINARY OFFER . . .

Basic Math Course for Electronics



Here's the quick and easy way to understand math as it applies to electronic shop practice. Gives you a complete set of highly useful mathematical tools and techniques of practical value. (Example: You have to replace a new stereo cartridge which feeds a 70 db preamp. The power amps each require 2 volts input for full rated output. What is the output requirement of the replacement cartridge?) In no time at all you will master the wide variety of such basic math computations which arise in everyday work—from Ohm's law to network algebra, from J operator to vector analysis. Clear worked-out examples, diagrams and tables, plus step-by-step learning, make this an invaluable aid for anyone who has trouble with math. 160 pps. Hardbound.

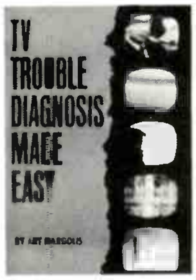
List Price $7.95 ● Order No. G 100

Electronic Circuit Design Handbook

New Third Edition—A brand-new, enlarged edition of the ever popular circuit designer's "cookbook," now containing over 600 proven circuits, for all types of functions, selected from thousands on the basis of originality and practical application. Now you can have, at your fingertips, this carefully-planned reference source of tried and tested circuits. Selected from thousands submitted by distinguished engineers, these "thought-starters" are a collection of original circuits selected on the basis of their usefulness. This detailed compilation of practical design data is the answer to the need for an organized gathering of proved circuits . . . both basic and advanced designs that can easily serve as stepping stones to almost any kind of circuit you might want to build. 384 pps., 19 big sections, over 600 illus., 8½" x 11".

List Price $17.95 ● Order No. T-101

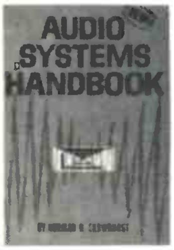
TV Trouble Diagnosis Made Easy



A brand-new picture-symptom service guide for solving every TV trouble, both color and black-and-white. You simply compare the symptoms you see and hear with those pictured or described and you'll be able to pinpoint any trouble to a specific circuit and component in short order. In the first Chapter, each trouble symptom is pictured and described to help you positively identify the probable cause. From there you are referred to one of the remaining 19 Chapters dealing with specific troubles in each section of the receiver, explaining how to further analyze existing symptoms and pinpoint troubles. Individual component tests are suggested, too, everything from flybacks to transistors. Includes many actual scope waveform patterns, TV screen photos, and schematic diagrams. 256 pps.

List Price $7.95 ● Order No. 544

Audio Systems Handbook



Complete reference and guide to audio system design, encompassing home entertainment, commercial sound and studio installations. Chapter 1, covering amplifiers and amplification, explains db and impedances, level limitations, insertion gain, plus a host of other basics necessary for practical system design. The author goes to great lengths to impart an understanding of these vital ingredients as they apply to overall operation. The same may be said of the treatment in succeeding Chapters on equalizers, mixers, filters, distribution systems, program sources, commercial systems, studios, and loudspeaker systems. 192 pps., 125 illus. Hardbound.

List Price $7.95 ● Order No. 494

How to Use Your VOM-VTVM & Oscilloscope

Whether you want to know more about how these instruments work, or how to use them in everyday applications, this "3-in-1" guide contains the answers. Moreover, it will be of tremendous value in helping you select the instruments best suited to your individual needs. Part I deals with the VOM—how it works, general guidelines for using a VOM, and how to use the VOM in troubleshooting all types of circuits, with step-by-step procedure charts you can refer to. Part II discusses the VTVM—describing functions, applications in troubleshooting, and servicing with the VTVM, pointing out applications where it is unique as a measuring device. Step-by-step servicing procedure charts are included. Part III discusses the oscilloscope and its applications in troubleshooting radio and television circuits. 192 pps; 120 illus.

List Price $6.95 ● Order No. 438

Small Appliance Repair Guide

Learn to repair dozens of small household appliances with the use of this authoritative, low-cost handbook. Profusely illustrated, the text tells how to find the cause of trouble in minutes, and how to go about making the required repairs. You'll also pick up helpful hints on disassembly and assembly, one of the real "tricky" aspects of many appliance repair jobs. General troubleshooting procedures are explained to familiarize you with the techniques of appliance repair. Succeeding chapters deal with thermostats, skillets, sauce pans, irons, toasters, coffee makers, blankets, mixers, knives, deep fryers, hair dryers, electric shavers, and small motors found in countless appliances. You'll learn how they operate, and how to make practical tests and repairs. 11 Chapters, 224 pps. Over 150 illus. Appendix and Index.

List Price $7.95 ● Order No. 515

104 Easy Transistor Projects You Can Build

How would you like to have a high-gain telephone pickup, a wireless mike, an electric megaphone, a CB receiver, light dimmer, fence charger, or any one of 104 such useful devices? You can build them yourself, at very little cost, and have a lot of fun in the process. What's more, you're bound to learn a lot about transistor circuits (including FETs and SCRs). A complete schematic diagram is included for each device, along with a parts list, plus a brief description of its operation and application, and notations concerning any critical points. All of the devices have practical application in the home, on the repair bench, in the ham shack, on your car, boat, airplane, etc. 224 pps. Hardbound.

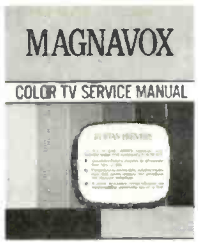
List Price $6.95 ● Order No. 462

On The Color TV Service Bench

A handy benchmate for practicing color TV technicians and B & W experts who want to break into color TV servicing. This new practical volume describes causes and cures for both the usual everyday color TV troubles, as well as those tough dogs you run into once in a blue moon. Here are commonsense service bench approaches for solving all sorts of color TV troubleshooting problems, many of them adapted from well-established B & W techniques. Definitely not a textbook, the content explains how to tackle specific problems in a logical, professional way. Moreover, the author clearly explains how the operation of each circuit is affected by specific faulty components. 192 pps. 14 Chapters. Hardbound.

List Price $7.95 ● Order No. 489

Magnavox Color TV Service Manual



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TEKLAB REPORT

A Look At Sylvania's E01 Color-TV Chassis

Part II—The bridge contrast circuit controls the contrast without disturbing the dc voltage level in the video system and brightness level at the CRT

■ Last month we reviewed the channel switching, VHF tuning, VHF oscillator and mixer, video IF amplifier and the AGC system of the Sylvania E01 color-TV chassis; while some of the more interesting circuits covered this month include: A high-voltage tripler circuit that reportedly requires only one-third the pulse voltage, relieving most of the stress normally present at the flyback transformer (Fig. 1); and a brightness-limiting circuit that controls the beam current and protects the CRT by restricting its emission level, thus increasing the CRT life. These are just a few of the important circuits employed in this chassis.

Brightness Limiter Circuit

The brightness limiter circuit shown in Fig. 2 is a closed-loop regulator circuit that controls the forward bias of the video amplifier transistor (Q212) and the dc level through the video and color drive amplifiers to the CRT cathodes. This circuit consists of the high-voltage winding in the horizontal-output transformer (T400), a sampling resistor (R468), diode SC418, capacitor C436, load resistor R466, threshold diode SC417, and voltage-divider resistors R462, R464, R286 and R288.

The peak-to-peak pulse across the sampling resistor (R468) is directly proportional to the beam current. Diode SC418 rectifies the negative going portion of this pulse and develops a negative voltage across the filter network, consisting of capacitor C436 and resistor R466. The threshold diode is reverse biased until the beam current reaches 700μa, which corresponds to about —11v at point "A" set by the divider (R462 and R464) from the regulated —20v voltage supply. The value of the sampling resistor (R468) was chosen so that the voltage on the cathode side of the threshold diode increases to —11.5v at this time (700μa). The threshold diode goes into conduction and the negative voltage at point "A" starts to increase with the beam current, reducing the conduction in the

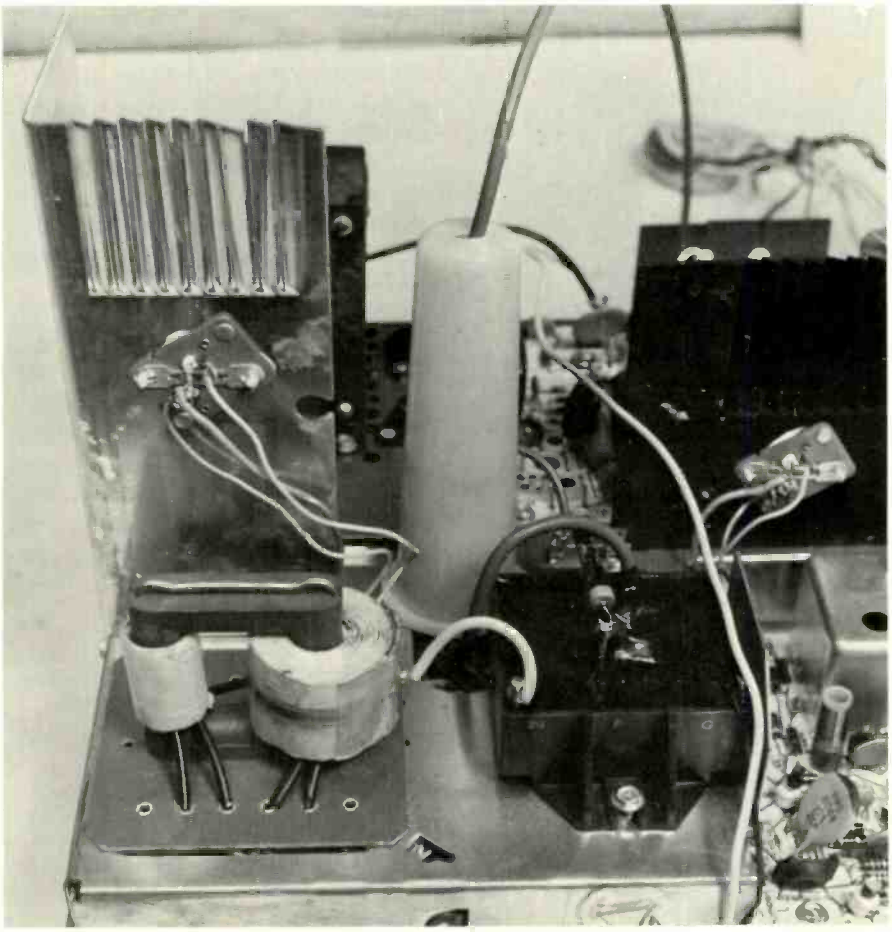

Fig. 1—The horizontal output transformer and high-voltage tripler circuit employed on Sylvania's E01 Color-TV Chassis.

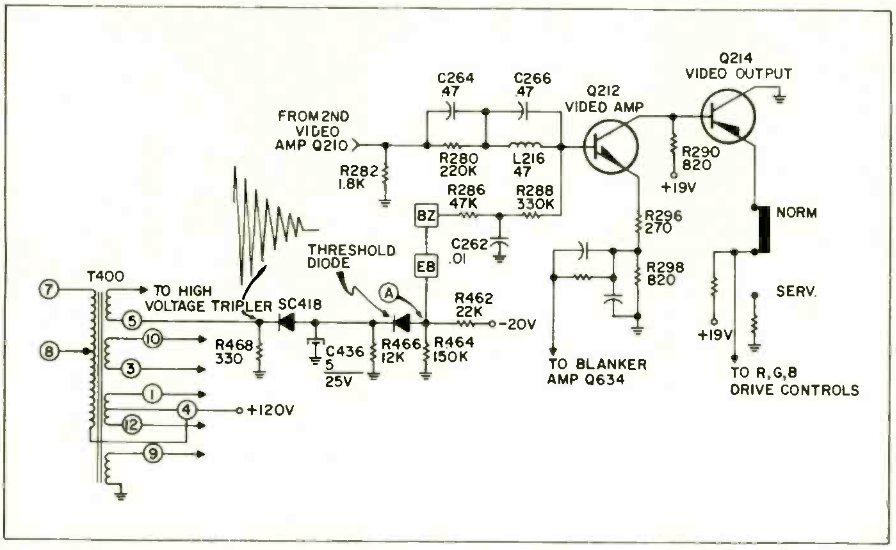

Fig. 2—The brightness limiter is a closed-loop regulator circuit which protects the CRT by limiting the beam current and restricting its emission level.

video amplifier transistor (Q212) and from there on the controlling action becomes continuous.

Bridge Contrast Control

The input drive to the second video amplifier transistor (Q210) is taken from the bridge contrast control circuit, as shown in Fig. 3.

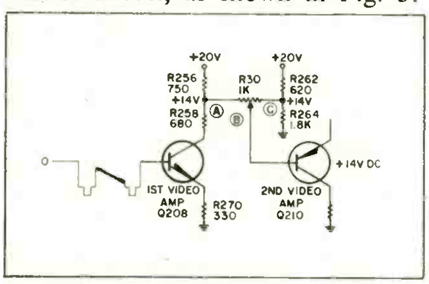

Fig. 3—The bridge contrast control circuit, employing a dc video amplifier chain.

This control system is a dc video amplifier chain, which has the advantage of being able to control contrast without upsetting the average dc voltage level in the video system and the CRT brightness level. The bridge circuit consists of resistors R256 and R258, first video amplifier transistor Q208, and resistor R270 on one side—with resistors R262 and R264, and contrast control R30 on the other side.

The control utilizes its parallel equipotential dc voltage to keep the dc level through the succeeding video amplifier stages constant. The resistance ratio of voltage dividers R262 and R264 is about 3-to-1, dividing down the 20v B+ and placing about 5v across R262 and the balance across R264. The voltage at the junction of R262 and R264 is a constant voltage of about +14v to +15v.

The first video amplifier transistor (Q208) is biased ON by its base voltage-divider network; and this forward biased voltage produces a 14v drop at the junction of resistors R256 and R258. Both ends of the contrast control are then at equipotential and no dc current flows. However, the Contrast control and resistors R264 and R262 form a video voltage divider across which the video signal variations are present. When the contrast control slider is at the point "C" end, junctioned with R262 and R264, the video drive is at its minimum and the dc voltage on the control arm does not vary. Thus, no dc shift occurs in the video amplifiers and the brightness level remains steady.

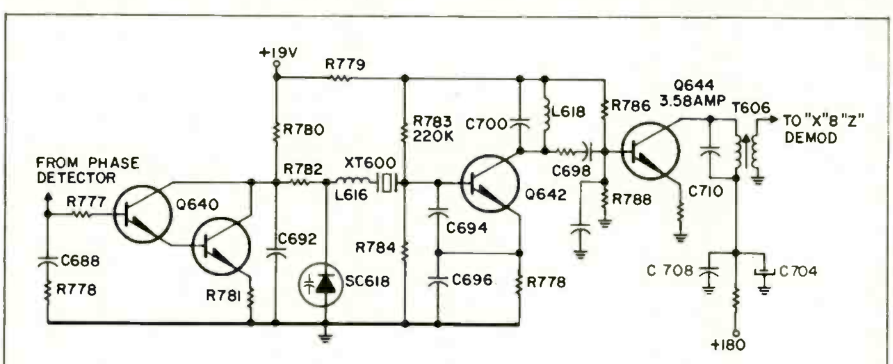

Fig. 4—The 3.58MHz CW oscillator utilizes a modified Clapp configuration.

3.58MHz CW Oscillator Circuit

The 3.58MHz continuous-wave (CW) oscillator circuit shown in Fig. 4 is a modified Clapp configuration using a 3.58MHz crystal in a series-resonant operating mode. This circuit provides a low-impedance feedback path from the collector to the base of transistor Q642, and mechanically controls the oscillator by its vibrating period. Capacitors C694 and C696 form part of the feedback circuit to sustain oscillation and as long as the feedback loop gain is unity, the oscillator will sustain operation.

A Darlington chip, AFC amplifier transistor Q640, actively controls the varactor (SC618) capacity through its forward bias and dc correction voltage from the phase comparator circuit. The oscillator load is a resonant tank circuit coil (L618) and capacitor (C700) tuned to 3.58MHz. Its output is capacity coupled through capacitor C698 to the 3.58MHz amplifier transistor (Q644), and a 3.58MHz buffer stage is required to develop additional 3.58MHz drive amplitude. The collector supply for this stage is the 180v buss voltage. Capacitor C704 is an additional 30μf, 150v electrolytic bypass capacitor parallel across capacitor C708 to neutralize any capacitor lead inductance and assure complete 3.58MHz bypassing. The 3.58MHz CW output transformer (T606) provides resonant gain for the CW signal and is the coupling to the X and Z demodulators.

Chroma Phase Control Circuit

Phase control in the 3.58MHz reference oscillator circuit (shown in Fig. 5) is accomplished by comparing the oscillator signal with the APC detector burst frequency.

The junction voltage of resistors

R768 and R769 consists of two voltages: The dc voltage provided by phase control transistor Q638; and the correction voltage provided by the APC detector, derived by comparing the phase and frequency of the 3.58MHz oscillator with that of the incoming burst signal. Without the burst signal or if the oscillator is running in phase with the burst signal, this voltage equals 0v.

The first voltage can be varied by potentiometer R776, which biases the APC amplifier transistor (Q640). With no burst signal (i.e., 0v correction) the reference oscillator's free running frequency is similar to the burst frequency. The second voltage (i.e., correction voltage) increases or decreases the first voltage, depending on whether the oscillator is leading or lagging the burst phase. This decreases or increases the collector voltage of transistor Q640. This transistor's change in collector voltage changes the capacity of the varactor diode (SC618), and this in turn changes the 3.58MHz crystal series resonance frequency, locking the frequency and phase of the oscillator to that of the pulse signal.

Transistor Q638 also stabilizes the AFC amplifier transistor (Q640) collector voltage to prevent temperature drift.

Automatic Color Control Circuit

The killer detector and ACC amplifier transistor (Q610) provide automatic chroma gain control (Fig. 6) for the first chroma amplifier transistor (Q606).

The killer detector diodes (SC610 and SC612), burst-phase transformer (T604), and associated components compare the burst amplitude to the CW signal. Without a burst signal, diodes SC610 and SC612 conduct equally and no voltage is developed at the junction of resistors R763 and R764. The voltage at this junction is the sum of two voltages: the voltage developed across resistor R767; and the voltage developed when diode SC610 conducts. In the presence of a burst signal, and if the oscillator is locked, SC612 does not conduct current, while SC610 conducts and develops a negative voltage.

The base voltage of transistor

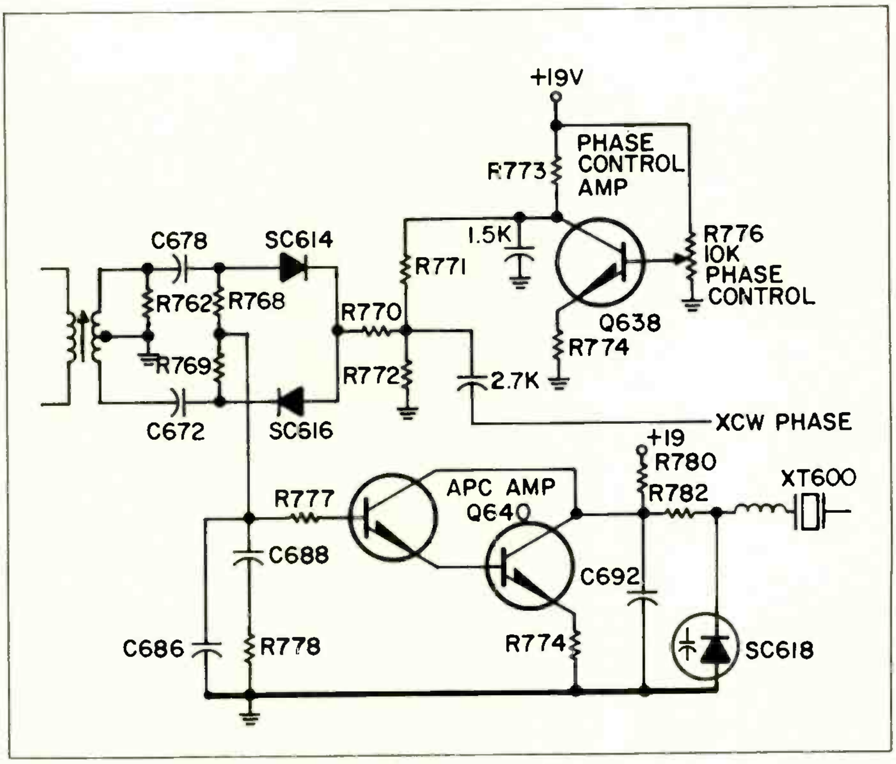

Fig. 5—The 3.58MHz reference oscillator phase control circuit.

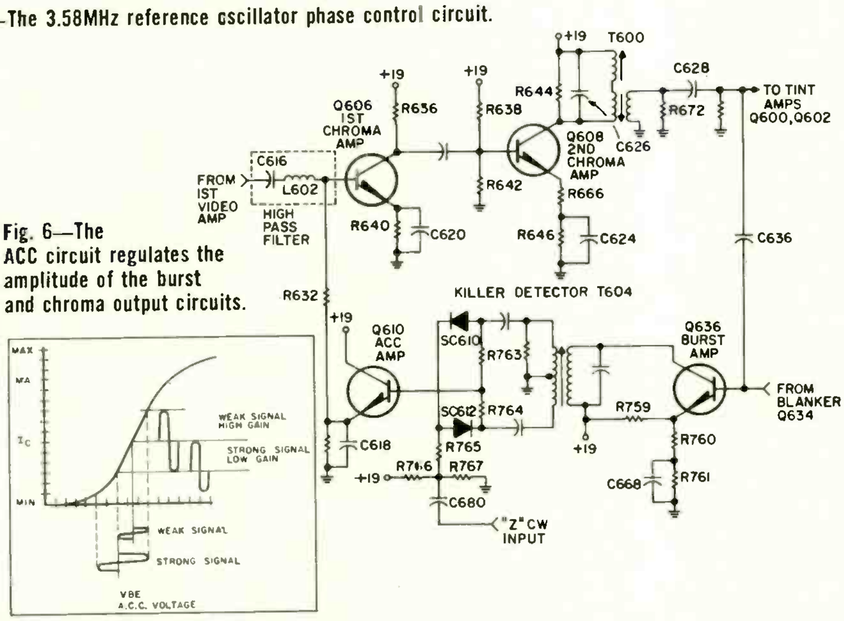

Fig. 6—The ACC circuit regulates the amplitude of the burst and chroma output circuits.

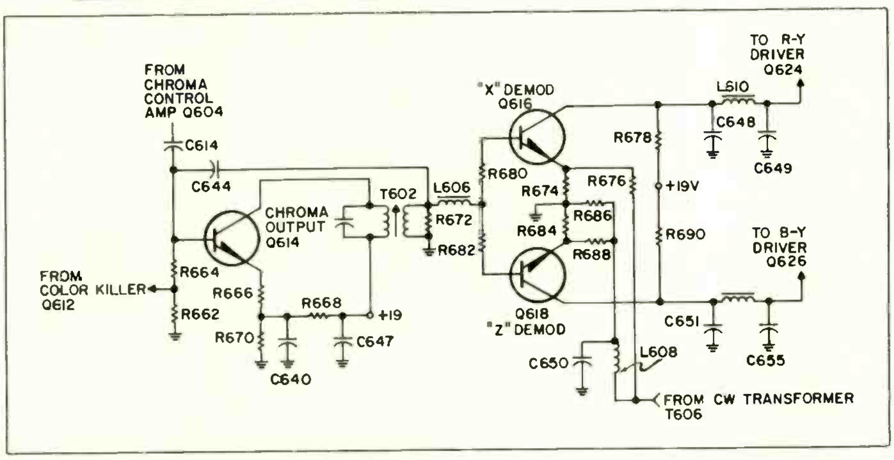

Fig. 7—The X and Z color demodulator circuits.

Q610 will decrease with the presence of a burst signal; and the higher the burst amplitude, the smaller the dc voltage at the base. This voltage biases the first chroma amplifier transistor (Q606) through the emitter follower transistor (Q610). Reduction in this voltage means a reduction in the emitter current of Q606 and correspondingly the gain of this stage—thus regulating the amplitude of the burst and chroma output circuits.

X and Z Demodulation Circuits

The X and Z demodulators shown in Fig. 7 are base driven by the phase- and amplitude-modulated chroma signal, while the 3.58MHz CW signal is fed to their emitters. The signal to the X demodulator transistor (Q616) is phase shifted 90° by L-C network coil L608 and capacitor C650. The CW signal injection into the demodulator emitter develops 3.58 MHz collector pulses.

When the chroma signal is applied to the demodulator bases, its phase and amplitude determines the conduction levels and demodulator collector voltage changes. When the chroma and CW signals are in phase, across the emitter-to-base junction, transistor conduction is lowered, raising the collector voltage toward B+—the chroma amplitude determining the collectors' voltage level. The quadrature relationship between chroma and CW regulates the collector voltage at the level developed by the CW signal.

Horizontal Output Circuit

The horizontal-driver transformer (T402) shown in Fig. 8 couples the driver-transistor (Q406) switching signal to the horizontal-output transistor (Q408) base. This transistor is turned ON by a positive going pulse, placing it in saturation. During transistor Q408's low-impedance condition, its collector (connected to a tap of transformer T400) is effectively grounded, causing an increase in current through the primary winding and deflection coils. Inductive reactance opposes the current increase through the deflection coils and the primary winding of T400, causing the magnetic field to develop linearly in the yoke coils and moving the CRT beam from the raster center to the extreme right.

When the base current of transistor Q408 is turned OFF and the base voltage becomes negative, the magnetic field in the flyback and deflection coils collapses, causing the voltage across capacitor C446 to rapidly increase.

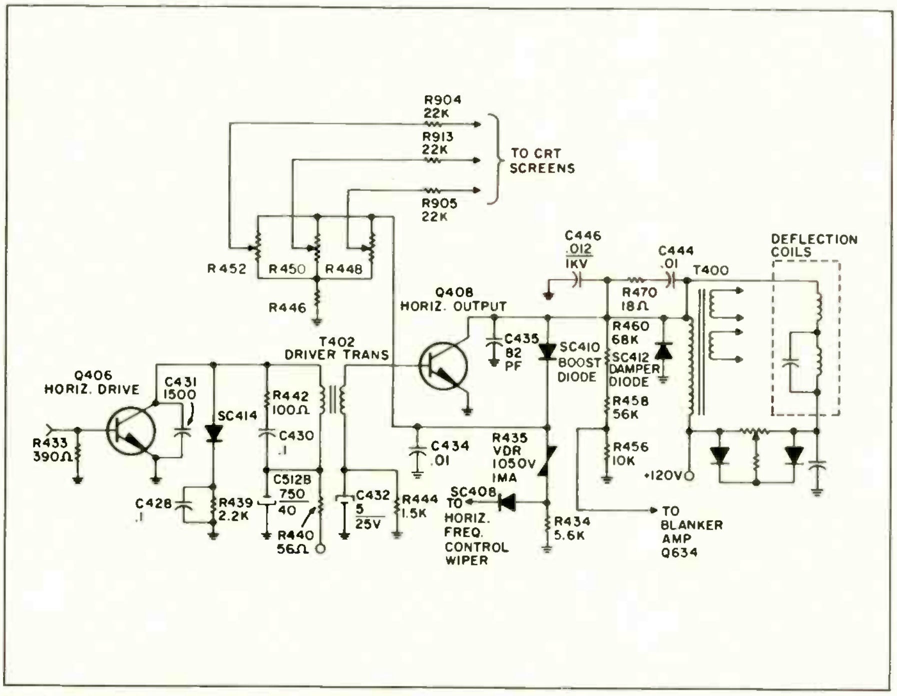

Fig. 8—The solid-state horizontal driver and output circuit.

Capacitor C446 and the deflection coils form a resonant circuit. The decreasing yoke current flows into C446 until it reaches 0ma, and at this point the electron beam has returned to raster center. Consequently when C446, which is now charged, discharges again into the yoke, the yoke current increases—but is now negative and therefore moves the beam to the extreme left of the raster.

The voltage, which began increasing the horizontal output when transistor Q408 was turned OFF and reaches a maximum when the beam returned to the raster center, again returns to 0v—following the characteristic change of a sine wave. The moment this voltage becomes negative, the damper diode (SC412) starts conducting, dissipating the stored energy—the yoke current dropping slowly to 0ma, bringing the beam back to the raster center.

B+ Boost Circuit

The high-energy pulse developed by the horizontal-output transformer (T400) turns ON diode SC410, applying the pulse to capacitor C434. This capacitor becomes charged to a dc voltage that is very close to the peak collector voltage of transistor Q408—this voltage being fed to the screen controls.

High-Voltage Overload Gate

Should the voltage level across the parallel resistance network—consisting of voltage-dependent resistor R435, resistors R434 and R446, Blue Screen control R450 and Red Screen control R452—increase drastically, the impedance of R435 decreases, placing a high voltage across R434. This voltage increase turns ON the high-voltage overload gate diode (SC408), causing a voltage increase at the horizontal control and forcing the horizontal multivibrator into a higher running frequency. The horizontal output transistor (Q408) is then turned ON for shorter periods of time and the peak currents and peak voltages in the output stage decreases—the tripler input pulse becoming lower along with the second anode voltage. ■

Mastering the TV Antenna System Market

by Lon Cantor

Industry experts predict that the decade of the '70s will see an unprecedented boom in Master Antenna TV systems. TV technicians can cash in on this boom if they are ready with the knowledge and skill it takes to sell, install and maintain MATV systems.

■ A recent ELECTRONIC TECHNICIAN/DEALER survey showed that three out of every four of the readers of this magazine are already involved in MATV. However, it is an undeniable fact that few independent technicians really go after MATV systems with an aggressive, consistent selling effort. This is unfortunate because the MATV business is a lot less competitive than the business of repairing TV sets. The more time you spend on MATV versus TV-set repair and home antenna installations, the more money you are likely to make.

This article will give you a brief background on how to sell, design and install MATV systems, with the emphasis on the latest equipment and methods available.

Why the MATV Boom?

MATV systems have been around for more than 20 years. Then why the sudden boom? Four factors are responsible for the current surge in MATV:

CATV During the 1970's, Cable TV systems are expected to cover a large portion of the United States. Cable TV invariably raises people's expectations for TV reception. CATV is dramatic proof that with a good antenna system you can get more channels and better picture quality on each channel. If a hotel, motel, apartment or school hooks up to a CATV system, they still need an internal distribution system, which the cable operator may or may not be able to provide. And in many cases, you can provide comparable reception by installing a good antenna system from scratch, saving your customer the monthly CATV fee.

COLOR TV Most of the MATV systems in existence today were designed for monochrome reception. Of course, a good monochrome system will work very well on color, too, but most of today's systems were sold on price and quality is poor indeed. The minor faults that were barely noticeable in black-and-white are intolerable in color. Therefore, many of today's systems must be upgraded or replaced.

UHF Since 1964, more and more UHF channels have come on the air. Older systems are not equipped to receive UHF. Many MATV systems are obsolete for this reason.

POPULATION GROWTH The most explosive force behind the coming MATV boom is new construction of hotels, motels, apartments and schools. All of these new buildings will require MATV systems.

How to Sell MATV Systems

Small MATV systems and renovations to existing systems are often sold directly to building owners. But the big market—new construction of sizeable buildings—is sold by a system of specifications and bids. If you want to make sales in this area, you must become an integral part of the system.

To sell MATV for new construction, you have to go through the following stages:

CONTACT THE ARCHITECT The architect is responsible for writing specifications. An architectural firm generally relies on a consulting engineer for specifications on electrical wiring, sound systems, lighting, air conditioning, MATV, etc. Whether the consulting engineer is a member of the firm or hired on a contractual basis, he is the man you must sell first.

The method is simple. Few consulting engineers are actually capable of designing a MATV system. Therefore, they need help in writing specifications that will produce a good, working system. If you offer your assistance to the consulting engineer and convince him that you know what you are talking about, he will write the equipment you recommend into the specifications. This is half the battle.

WORK WITH THE ELECTRICAL CONTRACTOR The electrical contractor is a sub-contractor of the general contractor. He is directly responsible for the MATV system as part of a much larger contract. Electrical contractors seldom handle MATV systems themselves. Where possible, the electrical contractor will subcontract the MATV system portion of the job to a firm such as yours. All that the electrical contractor wants is to make sure that the MATV system is properly installed, meets the specifications and works. Convince him that you can produce and the job is yours.

If you want to sell MATV systems in quantity, you must become acquainted with all of the consulting engineers and electrical contractors in your area. This does take quite an effort, but it is worth it. Especially if you can get an exclusive in your selling area for the particular brand of MATV equipment that you have written into the specifications. An exclusive protects you from cutthroat competition.

Make an effort to bid on every job you can. You will find out about jobs through Dodge reports as well as calls from consulting engineers and electrical contractors with whom you have worked.

Basically, you get jobs by render-

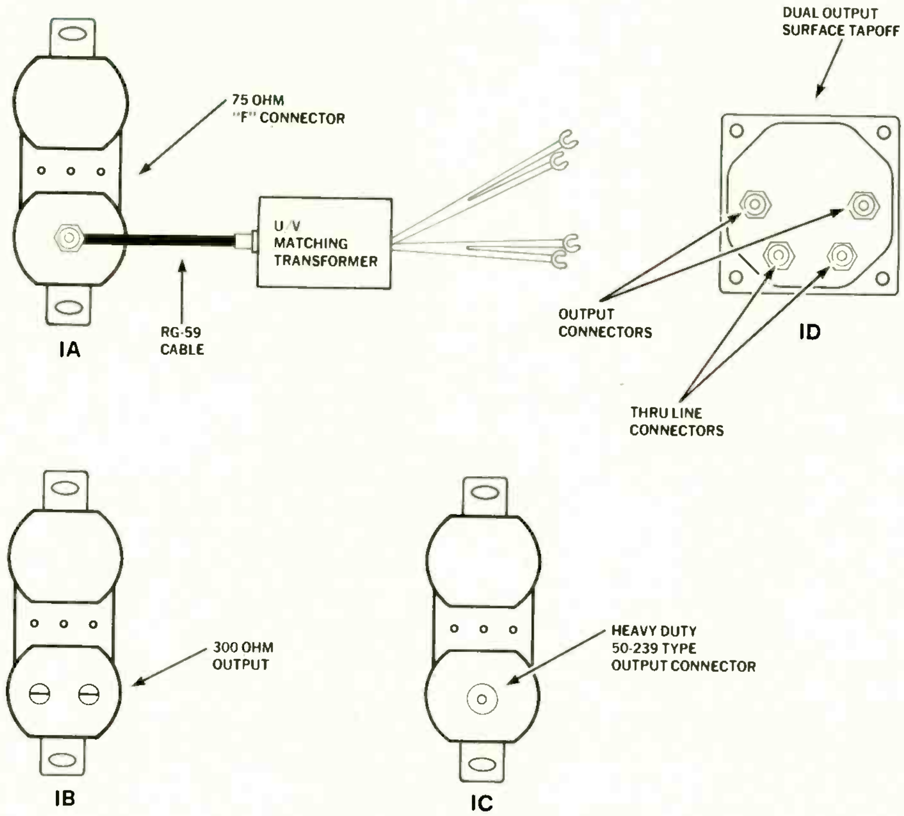

Fig. 1—The most common types of tapoffs available.

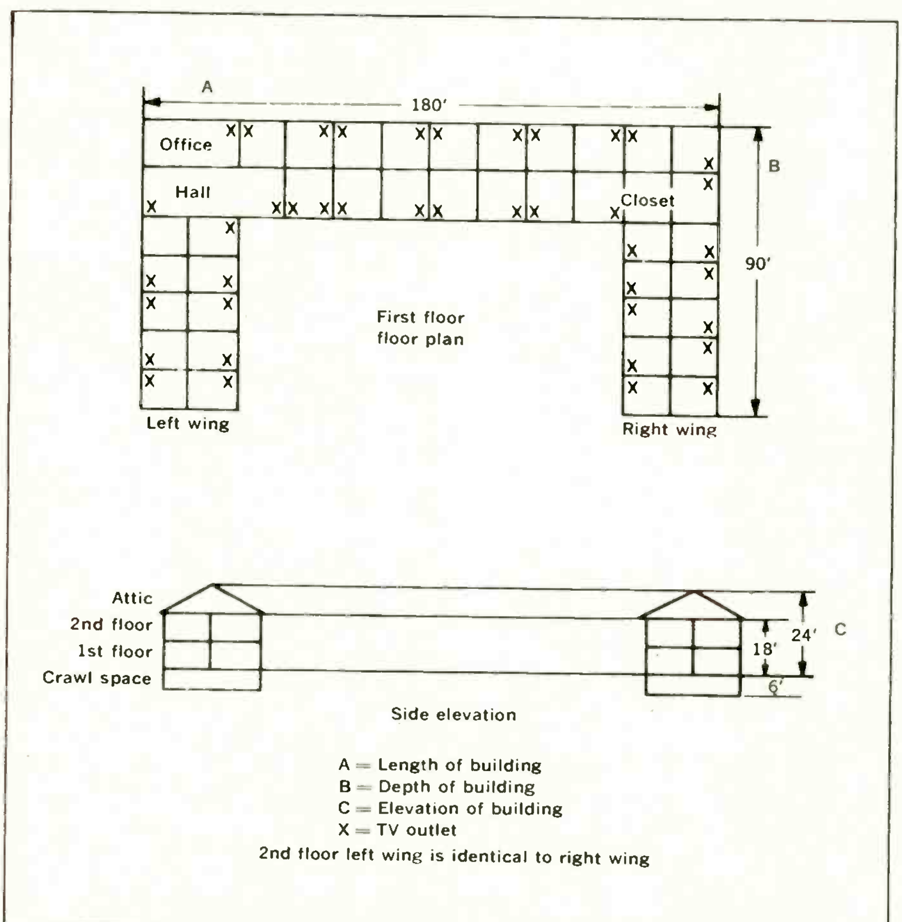

Fig. 2—A typical layout for a motel or school requiring a distribution system.

ing services to these two groups. You help the consulting engineer by furnishing him with a system design and specifications. You help the engineering contractor by giving him fast, accurate bids on the MATV portion of the work.

In many cases, the equipment manufacturer will be of tremendous help to you in both of these areas. JFD, for example, provides a complete design service, a specification writing manual, guidelines on bidding and estimates, and field back-up in selling and installing large systems.

MATV System Design

Much has been written about MATV system design. But, unfortunately, most books and articles on the subject talk about VHF-only systems, which are rapidly becoming obsolete. Also, many authors make the subject needlessly complex.

A MATV system can be broken into two basic areas: *The head end,* consisting primarily of antennas and amplifiers; and *the distribution system,* consisting primarily of splitters, tapoffs and matching transformers.

In planning a MATV system, we always start with the distribution system. Once we have decided how we are going to get TV signals into every room, it is relatively easy to choose head-end equipment.

Distribution Systems

The most important element in a distribution system is the tapoff. As the name implies, the tapoff siphons a small amount of signal off the MATV cable and sends it to the TV set. Fig. 1 shows a number of the most common types of tapoffs available. Your choice of tapoff depends on the needs of the system. Here are the criteria to consider:

- Within 20 miles of any TV transmitter, direct pickup can be a problem. Therefore, it is important to run coaxial cable right up to the back of the TV set. Use a tapoff with a 75Ω output and a separate matching transformer, as shown in Fig. 1A.

  If the system is within 10 miles of a transmitter, design it for +10dBm at each tapoff output to overcome direct pickup on the short length of twin lead inside the TV set.

- If the installation is more than 20 miles from a TV transmitter, a tapoff with a 300Ω output (see Fig. 1B) will work well. This makes the system less expensive, since it eliminates the need for a separate matching transformer at each TV set.
- Use *only* tapoffs with all channel (UHF and VHF) capability. Even if there are no UHF channels in the area at the time of the installation, the use of all-channel tapoffs will prevent obsolescence and the cost is not significantly higher.
- For schools, hospitals and other institutions, choose a tap off with a heavy duty SO-239 type output (see Fig. 1C). These connectors are more rugged than ordinary "F" type output connectors.
- If there is a chance that closed-circuit television might be added to the system, choose a back-matched tapoff. Back matching permits you to plug in a camera or a video tape recorder without causing interference on the line.
- For new construction, use a flush mounted tapoff. This type of tapoff fits into an ordinary electrical gem box. It should be installed after the walls are closed.
- For existing construction, use a surface mounted tapoff (Fig. 1D) and run the trunk lines as inconspicuously as possible.
- Tapoffs are generally available with 12dB, 17dB and 23dB isolation. In systems with less than nine tapoffs per trunkline, use only 12dB tapoffs. If there are more tapoffs in a trunkline, use 17dB tapoffs at the beginning of the line and 12dB tapoffs at the end of the line. If there are more than 15 tapoffs (the actual number depends on through loss of tapoffs chosen) in the line, use 23dB tapoffs, followed by 17dB tapoffs, followed by 12dB tapoffs.

Next, you have to decide how many trunklines you will need. This is determined by the physical layout of the building. Fig. 2 shows a typical motel or school, and Fig. 3 shows the distribution system to serve it. Fig. 4, 5 and 6 show other common types of distribution systems.

Calculating Losses

Once the distribution system is laid out, you have to calculate how much signal is lost between the head end and the last tapoff at the end of the longest trunkline. If we can get good TV signals to the last tapoff in the system, we can be pretty sure of getting good signals

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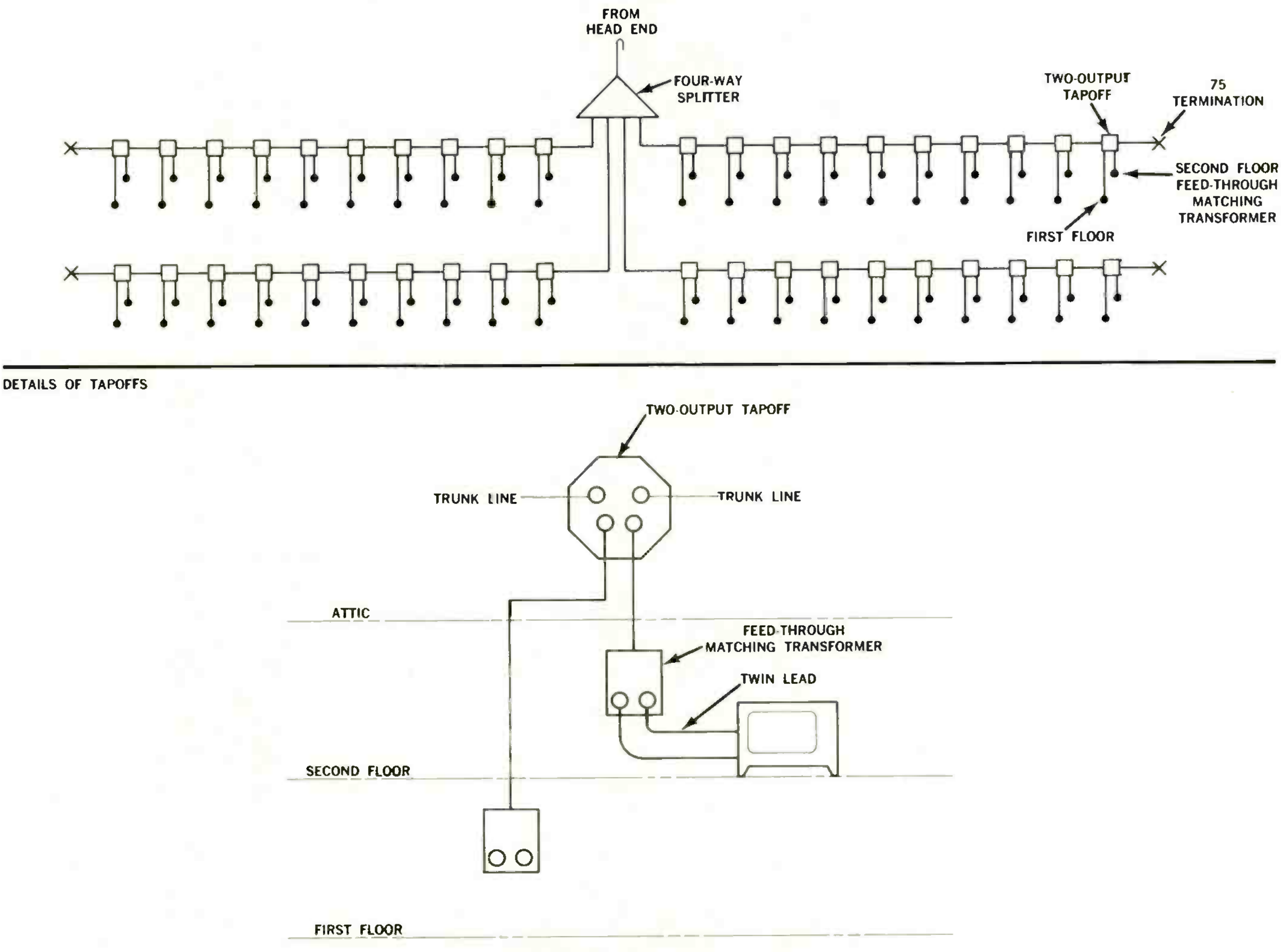


Fig. 3—The distribution system for this typical two-story, 80-room motel or school.

Television Signal Injection

by Phillip Dahlen

Your job can be made easier by injecting a television signal directly into each circuit of the TV set being serviced

Fig. 1—The usefulness of B & K's Model 1077B Television Analyst is demonstrated with the aid of B & K's Precision Model 1460 Triggered-Sweep Scope and an Admiral T7K10-1C Chassis portable Color-TV set. For added convenience, the scope is used on an Easy-Up Scope Cart.

■ Although a good scope is a must for effective TV-set servicing, another very useful test instrument is the Television Analyst. This article demonstrates the usefulness of B & K's Model 1077B Television Analyst by using it in conjunction with a B & K Precision Model 1460 Triggered-Sweep Scope and an Admiral T7K10-1C Chassis portable Color-TV set (Fig. 1). The use of plug-in extension cables permits the convenient placement of both the TV-set chassis and its cabinet, containing the picture tube.

The analyst functions like a self-contained TV station, providing its own audio, horizontal- and vertical-sync signals, and using a flying-spot scanner to provide any desired video signal. A CRT inside the instrument (Fig. 2) produces an unmodulated raster, similar to that seen on a TV set tuned to a vacant channel. A transparent test pattern, placed between the photocell (partly shown at the lower left of the picture) and the CRT, determines the brightness of every segment of the raster that is seen by the photocell. In this manner, the photocell is used to produce the video signal.

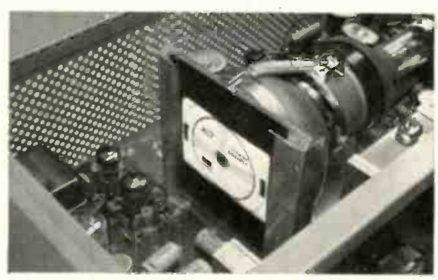


Fig. 2—One of many transparent test patterns that can be used to produce a video signal.

RF Signal Injection

Substituting a cross-hatched test pattern for the one shown in Fig.

2, and tuning both the analyst and TV set to VHF Channel 13, while feeding RF signals from the analyst through the VHF-tuner antenna leads, results in the TV-set picture shown in Fig. 3. A similar TV-set picture is produced by the TV set (Fig. 4) when the RF leads are

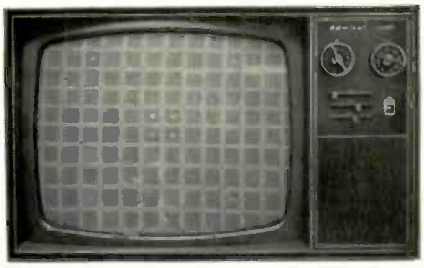


Fig. 3—TV picture produced when TV set and analyst are both tuned to Channel 13. VHF Channels 2, 3, 4, 6, 7, 8 and 12 are also available from the analyst.

Fig. 4—TV picture produced when TV set and analyst are both tuned to Channel 30. All other UHF channels are also available from the analyst.

connected to the UHF-tuner antenna leads and both the TV set and analyst are tuned to UHF Channel 30.

IF Signal Injection

Should both tuners become defective, we can still get the desired test pattern by adjusting the analyst to produce IF video signals and connecting it to Terminal A of printed-circuit board PWS-1. (This and other circuit terminal points are shown in the March TEKFAX, Schematic No. 1346.) Although it is a little difficult to connect the test probe to this terminal through the shield, once connected, the test pattern again appears on the TV-set screen (Fig. 5). For those for whom the TEKFAX schematic is not readily available—this terminal feeds IF signals to the base of the first IF transistor (Q1) through an R-L-C circuit.

Test Point TPA1 is much more easily reached (Fig. 6), and from

Fig. 5—TV picture produced when IF signal is fed to first stage of IF strip.

it the injected IF signal produces the picture shown in Fig. 7. (The signal applied at this test point replaces that normally developed at the collector of the same first IF transistor, Q1.) If transistor Q1 were defective, we would see a picture on the TV set when injecting a signal at Test Point TPA1, but not when injecting the same signal at printed-circuit board Terminal A.

Up to this point no difficulty is experienced when inserting RF or IF signals into the TV set. However, upon progressing to the

Fig. 6—Connections made for applying analyst signal to collector of first IF transistor.

Fig. 7—TV picture produced when IF signal is fed to collector of first IF transistor.

Fig. 8—TV picture produced when IF signal is fed to collector of second IF transistor.

collector of the second IF transistor (or actually our connection at coil LA28), IF circuit gain becomes relatively small and only a snowy picture can be seen on the TV set (Fig. 8). But even when the analyst's IF signal output is not directly connected to the IF strip (Fig. 9), the TV set's AGC circuit automatically adjusts to produce high enough IF circuit gain for the TV set to still show a snowy test pattern (Fig. 10). We can stop

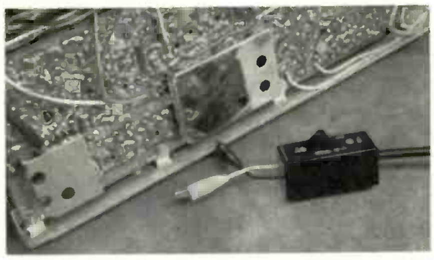


Fig. 9—Analyst lead injects IF signals into TV set even when not physically attached.

Fig. 10—TV picture produced when IF signal is received from unattached analyst lead.

transmitting this IF signal through the air by reducing the IF output from the analyst, but then the IF signal injected directly into the base circuit of transistor Q3 is not strong enough to produce even a snowy test pattern. However, whether the IF signal from the analyst is injected directly or indirectly, no test pattern will be produced unless transistor Q3 functions properly.

Video Signal Injection

Beyond the video detector diode (CRA55) it is no longer necessary to deal with RF or IF signals bearing the test pattern; we instead can directly inject the video signal produced by the analyst. Fig. 11 shows the test pattern produced on the TV set when the video signal is injected through Test Point TPC2 directly to the base of the first video amplifier transistor (Q13).

Injecting the video signal to

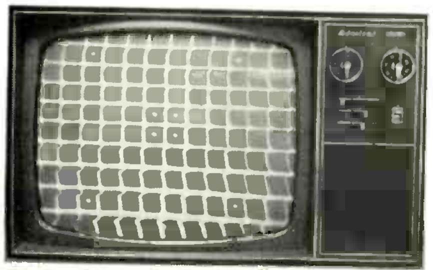


Fig. 11—TV picture produced when video signal is fed to base of first video amplifier transistor.

either Terminal H of printed-circuit board PWS2—the output of delay line DLH43—as shown in Fig. 12 or to the input of that line (shown unnecessarily disconnected in the same photo) also produces a test pattern on the TV set (Fig. 13).

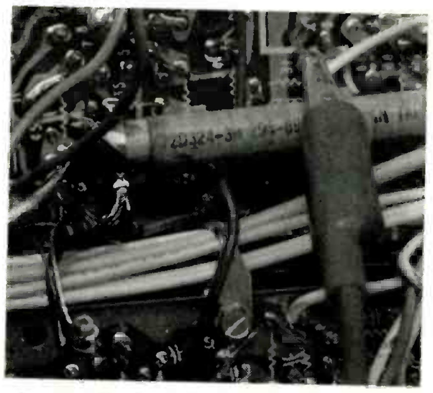


Fig. 12—The input to delay line DLH43 is disconnected and the analyst's video signal applied to its output.

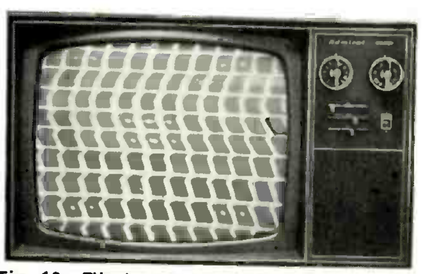


Fig. 13—TV picture produced when video signal is fed through delay line to grid of second video amplifier tube.

However, it is necessary to critically adjust the horizontal sync control to obtain this picture. We are now driving the TV set through a grid of the second video amplifier tube (V2B).

Test Pattern Selection

As a matter of interest, the RF signal from the analyst can again be fed to the antenna of the TV set to obtain a video signal at printed-circuit board PSW1 Terminal G (shown disconnected in Fig. 12) to compare it on a scope with the video signal obtained directly from the analyst.

When the B & K Precision Model 1460 Triggered-Sweep Scope is synchronized with the vertical sweep rate of the TV set and analyst, and the video signal is reduced to zero (no picture appearing on the TV set), we observe only the vertical sync pulses (negative pulses) carried through the TV set (Fig. 14). By increasing the analyst's video output to a level where a good test pattern could be observed, we can see the video signal (small positive pulses) corresponding to the horizontal bars in the test pattern (Fig. 15). A similar waveform is also available directly from the analyst (Fig. 16).

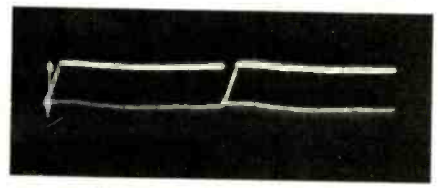


Fig. 14—Waveform of signal received at Terminal G of printed-circuit board when no RF video signal is applied to the TV set and the scope is synchronized to the TV set and analyst's vertical sweep rate. The negative pulses are formed by the vertical sync signal.

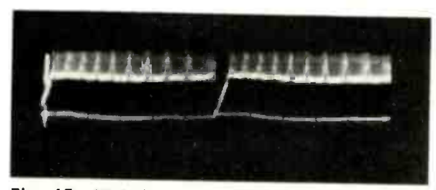


Fig. 15—Waveform of signal received at Terminal G of printed-circuit board when an RF video signal is applied to the TV set and the scope is synchronized to the TV set and analyst's vertical sweep rate. The positive pulses correspond to the horizontal lines in the test pattern.

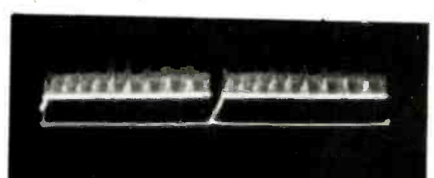


Fig. 16—Waveform of signal received directly from video output of analyst when the scope is synchronized to the analyst's vertical sweep rate. This waveform is virtually identical to that obtained from the TV set.

When the scope is synchronized with the horizontal sweep rate of the TV set and analyst, and the video signal is reduced to zero (again no picture appearing on the TV set), only the horizontal sync pulses carried through the TV set (negative pulses) are observed (Fig. 17). By increasing the analyst's video output to a level where a good test pattern could again be observed, we can see the video signal (small positive pulses) corresponding to the vertical bars in the test pattern (Fig. 18). A similar waveform is available directly from the analyst (Fig. 19).

The unique advantage of the particular B & K test pattern selected for use in this article should now be obvious, for it involves the use of a video pulsed signal (corresponding to horizontal and vertical bars) that can be readily observed on any good quality scope—should it be necessary to use a scope as a video signal tracer. This is quite unlike many other test patterns or live TV programs where there is no such apparent consistency to the video signal. ■

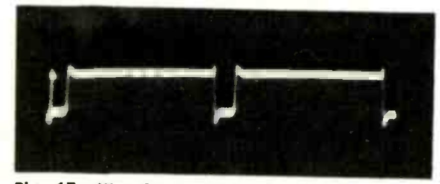


Fig. 17—Waveform of signal received at Terminal G of printed-circuit board when no RF video signal is applied to the TV set and the scope is synchronized to the TV set and analyst's horizontal sweep rate. The negative pulses are formed by the horizontal sync signal.

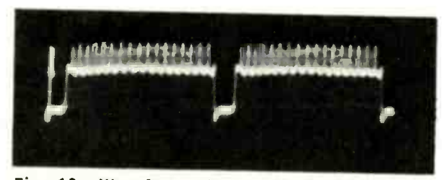


Fig. 18—Waveform of signal received at Terminal G of printed-circuit board when an RF video signal is applied to the TV set and the scope is synchronized to the TV set and analyst's horizontal sweep rate. The positive pulses correspond to the vertical lines in the test pattern.

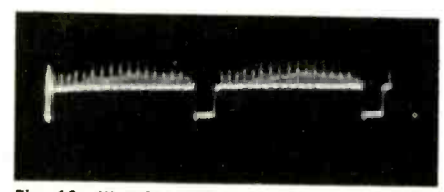


Fig. 19—Waveform of signal received directly from video output of analyst when the scope is synchronized to the analyst's horizontal sweep rate. This waveform is virtually identical to that obtained from the TV set.

Closed-Circuit Television

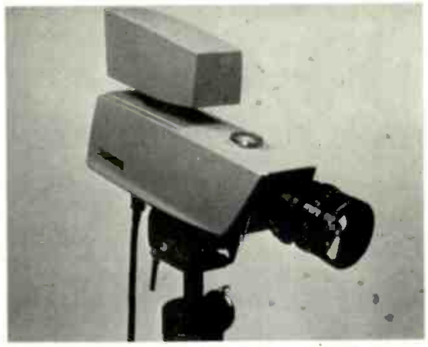
by Phillip Dahlen

Expand your current business to include a rapidly growing field requiring your present technical skills

■ Our technology has now progressed to the point where television systems are simple, economical and reliable enough to be operated by the general public. In fact, the state of the art has developed to the point that Magnavox will soon be marketing a single vidicon color-TV camera designed to eliminate color registration problems. Now that TV systems have received such universal acceptance, there is an increased demand for applying these systems to virtually every walk of life. And since we are already familiar with TV circuitry, this means that we are the ones best able to install and service them. By covering a few of their many applications, we hope to give you a better idea of where you might increase your business by promoting such systems.

From a video monitor room at S. Klein's department store in Yonkers, N.Y., one person can outproduce an entire team of detectives working 300 man hours a week.

Electronic surveillance resulted in 68.2 percent of the total apprehensions within the first eight weeks of operation at S. Klein's.



Weighing only 30 lb, the single vidicon design eliminates the color registration problems of other video cameras, and the consequent electronic simplification is said to result in high reliability and easy maintenance.

Video Security

"For years," says Bert Lang, corporate security director for S. Klein's 17 department stores and 2 warehouses, "store detectives and security forces were looked on as a means of combatting thieves, period. Today, retail security is more sophisticated. Now we're talking loss prevention—stopping thefts or malpractice before they are committed, locking the barn door while the horse is still inside."

Klein's Westchester security system has proven "dramatically" effective, according to Mr. Lang. And that effectiveness stems from its close coordination between video camera surveillance and videotape recording. Their Panasonic NV-3020 recorder resulted in 68.2 percent or better than two thirds of the total apprehensions within the first eight weeks of operation.

Apprehensions start when the monitor operator spots a crime in progress or a suspicious act on one of her monitor screens. Immediately she begins recording that image, as well as taping the time and date on the video recorder's audio track. Then she dispatches a guard or detective to the scene. Using a one-way wireless voice dispatching system, she tells the detective the nature of the theft, describes the individual and tells the detective where the merchandise has been secreted. "We've even been able to electronically follow the people being apprehended right out of the door, where they're picked up by the guard," Mr. Lang says.

Using a joy-stick on the control panel to aim the camera, and a remote-controlled zoom lens to zero in on specific areas, the operator can often document such small actions as pulling off or switching price tickets. She can also read employee identification badges, and see exactly what is being rung up on a cash register. According to Mr. Lang, those cameras with 150mm lenses can even distinguish between a one- and a five-dollar bill.

Bert Lang gives a lot of the credit for the system's success to Visi-Tel Corp. of New York City, the dealer who planned and installed the system and who custom built the control panel to Klein's specifications.

"The successful operation of closed-circuit TV develops after the installation is made," Mr. Lang says. "Visi-Tel did not let the project just die after installation, as so many good systems have in other stores. They're actively giving us service, providing us with signs and decals to make sure people know about the system, and advising us about new equipment."

The store has greater flexibility in adopting new equipment, since it is leased from Visi-Tel rather than owned outright.

Police Training

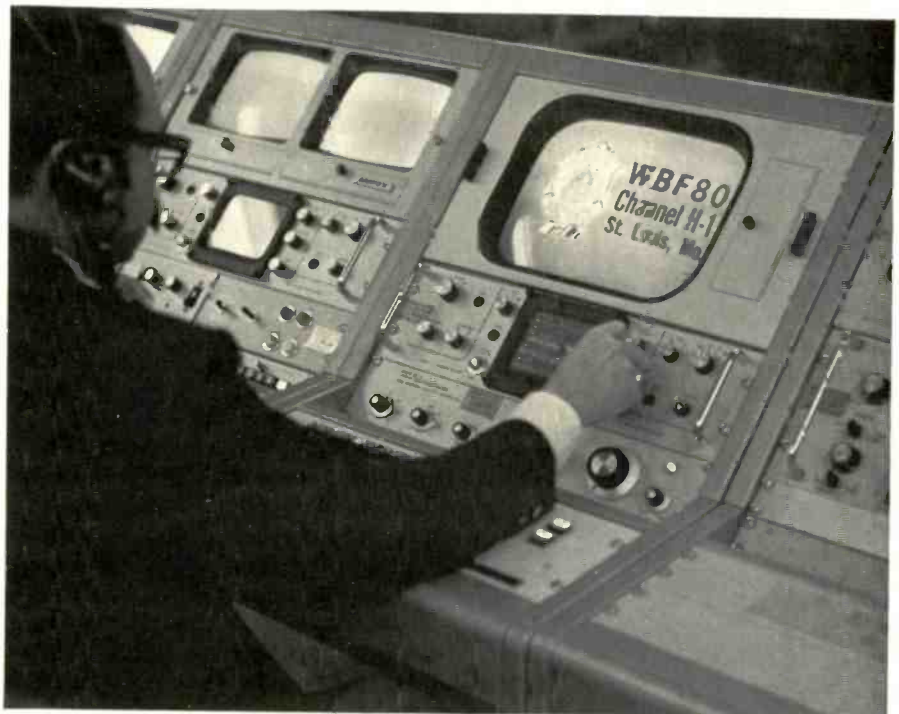
Just as S. Klein's has found CCTV a significant aid in fighting crime, the St. Louis, Mo., Police Dept. has found television very useful in their work. Although we are including their system in this CCTV article, since they originate TV signals for their own use, it does make use of a TV transmitter to permit efficient signal distribution over a wide area without the use of TV cables.

Broadcasting on the 2.5GHz educational TV band (designed for transmitting within a limited area on non-commercial channels), Station WBF80—Channel H-1, owned and operated by the department, disseminates police training and internal police subjects to headquarters and the city's eight district police stations.

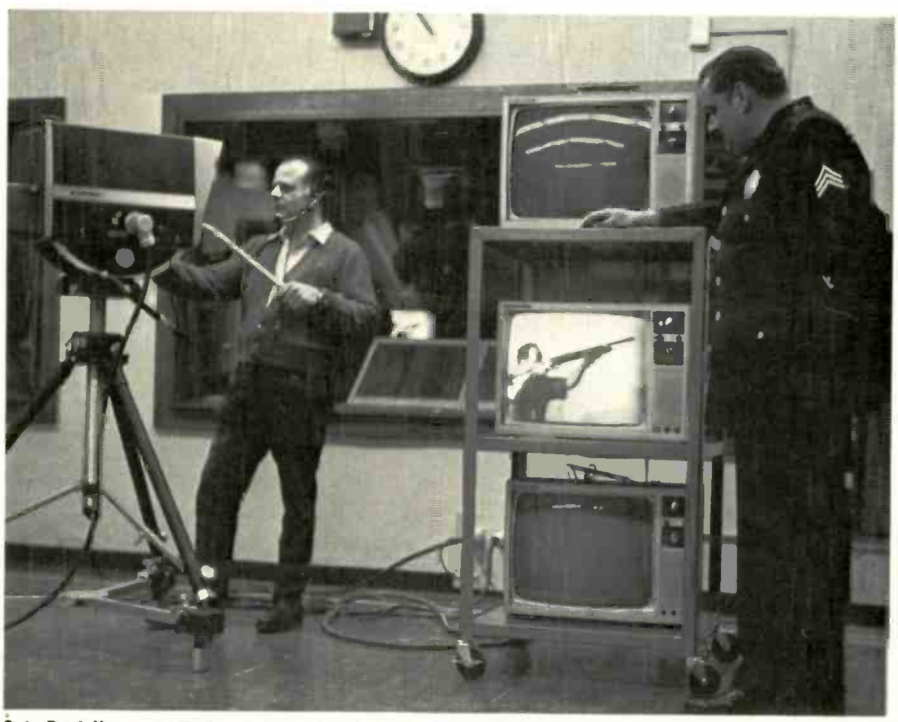
The St. Louis system, which facilitates complete production and recording capability, was installed by Ampex under a $200,000 contract. The company's engineers supervised all phases of the project from studio equipment operation to tower erection.

The transmitter and control studio are housed in the police academy, contiguous with department headquarters in downtown St. Louis. The system uses centralized broadcast and closed circuit videotape recorders to record program segments for later replay. A mobile van is also equipped with closed-circuit videotape recording equipment and TV cameras for on-the-spot documentation of accident or crime scenes.

Colonel James L. Sanders, president of the St. Louis Board of Police Commissioners said, "By providing increased training opportunities and



The St. Louis Police Dept. is said to be the first law enforcement agency in the country to be licensed by the FCC to use the 2.5GHz educational-TV band.



Sgt. Paul Herman, director of the St. Louis Police Academy, reviews a weapons training program as it is being televised and simultaneously recorded on videotape in the Police Academy studio.

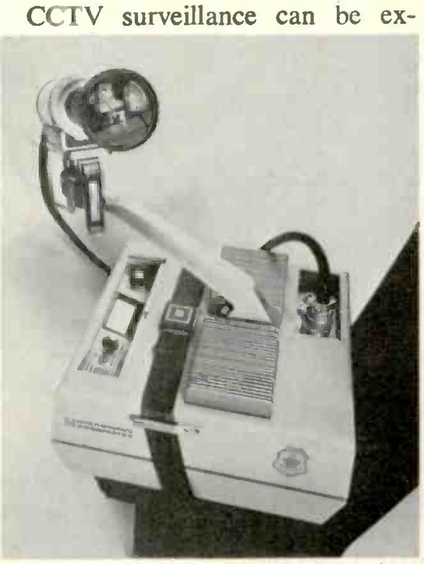
instant communication both within the department and with other area police departments, this system should have the effect of upgrading law enforcement in greater St. Louis."

One important operational application of the CCTV system will be the elimination of the daily show-up of recently arrested suspects. This show-up has been limited in recent years by the 20 hour limit on holding suspects, early release on bond and the recognizance program. A videotape of each suspect, made immediately upon arrest, provides a picture and sound record that gets by these hurdles. The videotapes can then be seen at any or all nine receiving stations at any time in the future by plaintiffs, witnesses and police.

Police officials believe that a videotape of suspects and interrogating officers together would be of significant assistance. It can help to protect individuals' rights, serve as a subsequent review of the facts or be held as evidence. Other possible uses of videotape include: recording confessions, recording abnormal behavior (such as manifested by persons under the influence of alcohol or drugs), transmitting pictures of suspects and persons in custody or "wanted" pictures during roll calls in all districts, and transferring stolen and recovered vehicle lists.

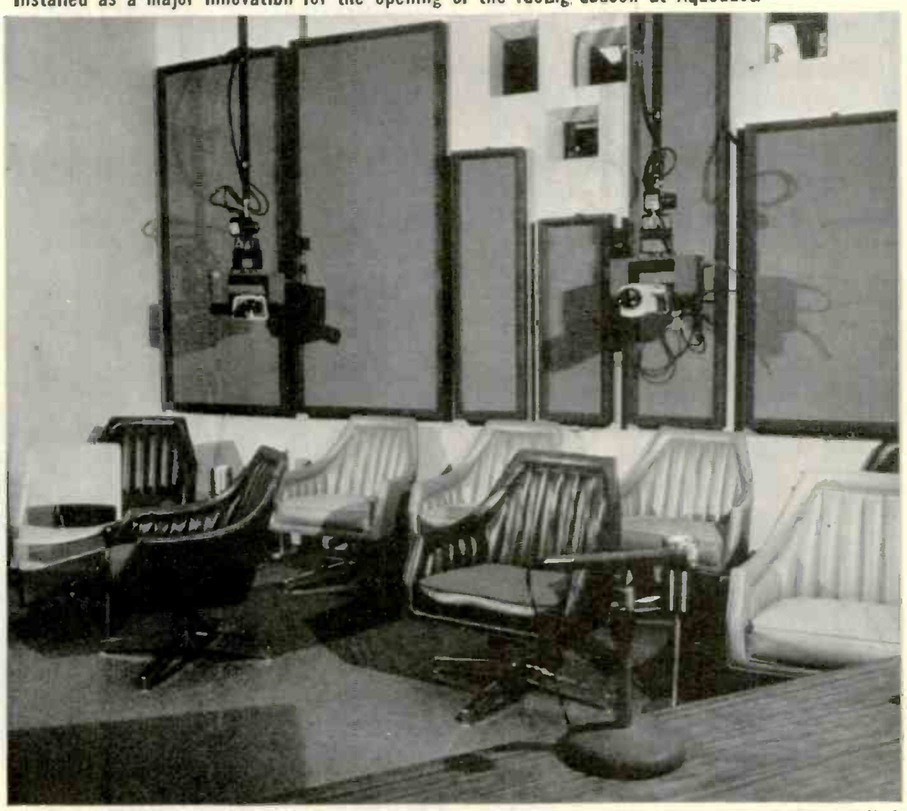
Eye-in-the-Sky

CCTV surveillance can be expanded from department stores and police stations to even the sky overhead. Microwave Associates announces the introduction of their Eye-in-the-Sky Mark 2 system, which provides law enforcement and public safety officials with live CCTV surveillance from a helicopter. The system is comprised of a zoom-lens TV camera, 15w solid-state transmitter and an omni-directional antenna. The airborne unit comes in a single housing which can be mounted in any helicopter and



This system, consisting of a zoom-lens camera and solid-state transmitter, can provide law enforcement and public safety officials with live CCTV surveillance from a helicopter.

Technical supervisor Gerd Kroeber adjusts the controls for color-TV reception by the 65 TV sets installed as a major innovation for the opening of the racing season at Aqueduct.



In the previewing room of the New England Telephone Company's TV system, two remote-controlled, ceiling-mounted cameras are used for self-critiques and role-playing.

TEST INSTRUMENT REPORT

Handy push-button function switches simplify selecting the instrument's mode of operation

Digilin's Model 340A Digital Multimeter

by Phillip Dahlen

Digilin's Model 340A Digital Multimeter. For more details circle 900 on Reader Service card.

■ To the distress of one of my college electronics instructors, I always preferred using logarithm tables rather than a slide rule for the many electronics calculations required in the course. His typical response was that the electronics industry was never concerned with better than 5 percent tolerances—the extra accuracy that I attained with my tables being unnecessary.

We have now reached the degree of sophistication where this is no longer the case—particularly in applications involving dc-coupled, solid-state circuitry. But, just as the degree of accuracy that is now becoming necessary tends to make electronic applications for the slide rule obsolete, a similar problem is becoming more frequently encountered when attempting to obtain a sufficient number of significant figures from the scale of a galvanometer (meter movement). As a result of this need for greater accuracy, more of the technicians in our industry are becoming faced with a need for digital meters.

Priced at under $400, the manufacturer of this instrument indicates that it contains an automatic zero adjustment and constant high-input impedance, fast response, high ac stability, easy accessibility and flexibility in power choices. It is said to feature 60dB normal mode rejection at 60Hz and 100dB common mode rejection. One probe reportedly takes care of all measurement functions, full scale responses occurring in less than 1 sec.

Other manufacturer specifications are as follows:

Full-scale ranges available:	1v to 1kv, ac and dc 1K to 1M 100μa to 1a, ac and dc

100% overrange on all ranges, overvoltage protection of 100 times the selected range (1kv and 1a maximum).

Maximum Sensitivity:	1mv, 100na, 1Ω
Accuracy:	dc volts—±0.1% full scale, ±1 digit ac volts—±1.0% full scale, ±1 digit ohms—±1.0% full scale, ±1 digit ±5.0% full scale, ±1 digit on 10M scale
Readout:	3½ digits, 3 NIXIE tubes plus a neon "1" and a minus sign
Dimensions:	6 in. W by 9 in. L by 5½ in. H
Weight:	3 lb

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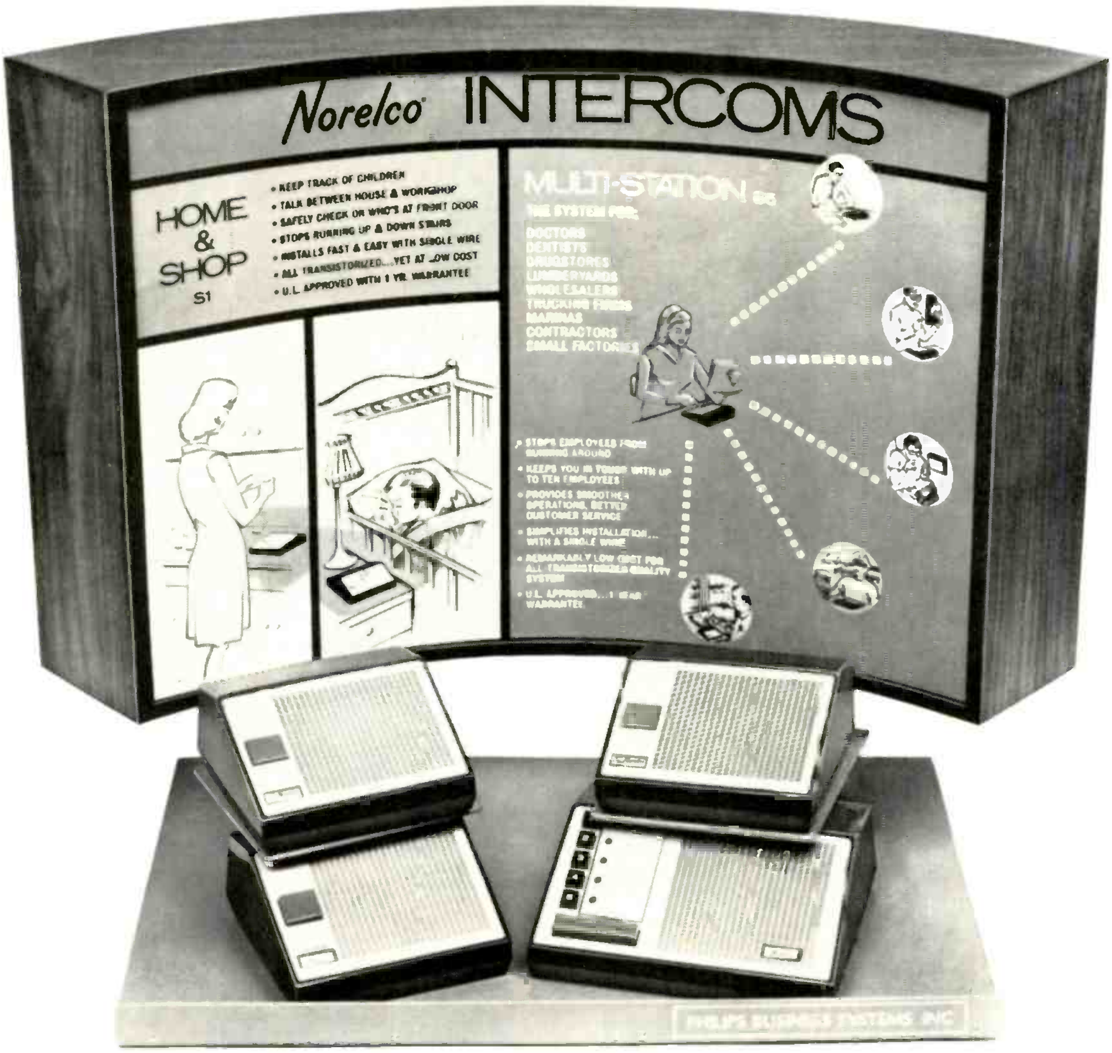

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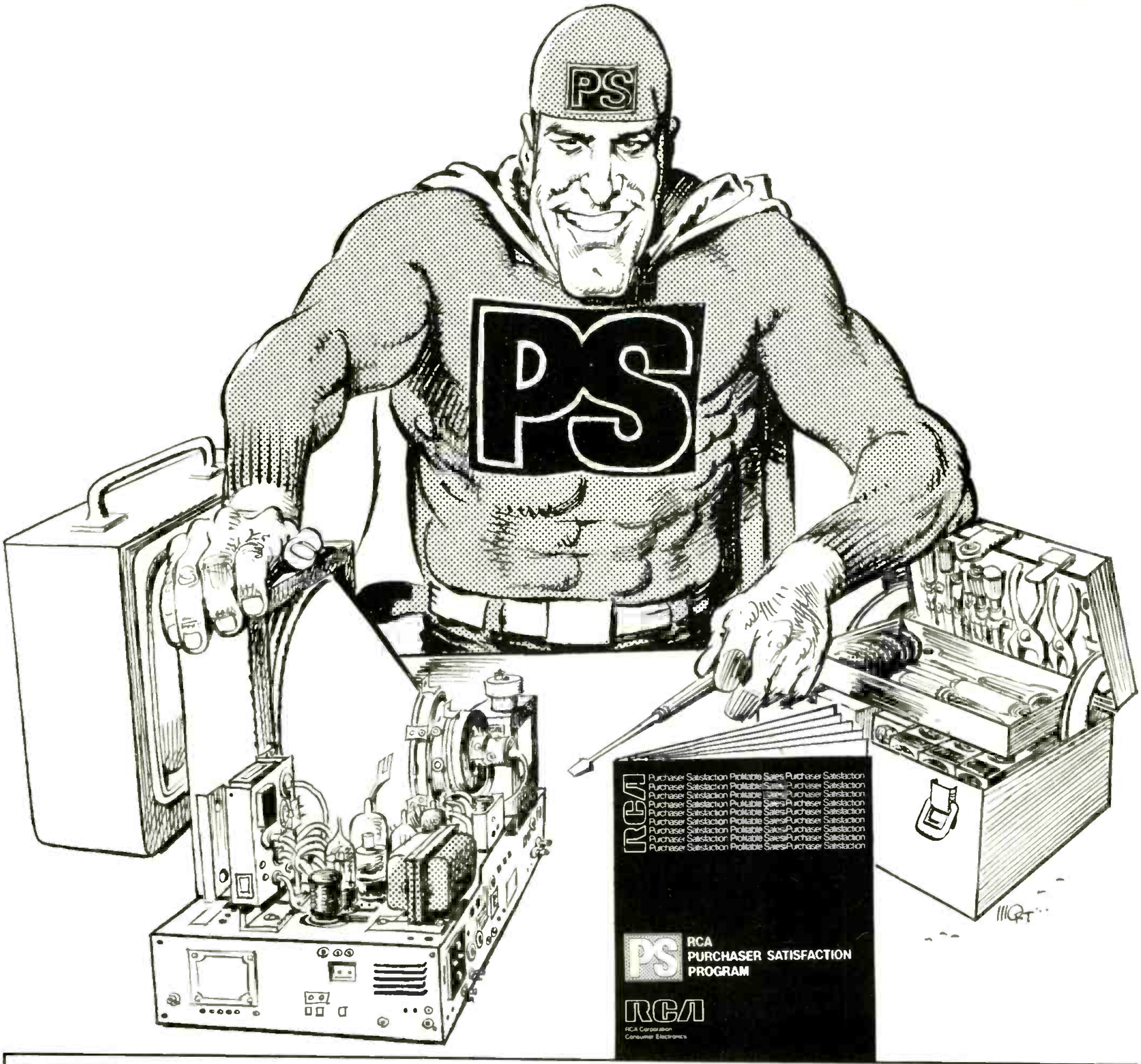
Just because we were #1 in 1970 color TV sales to consumers doesn't mean we've forgotten you today. We created "PS", a warranty program which backs you up as well as every AccuColor® TV. PS means Profitable Servicing for two reasons: First, because AccuColor owners can select any service agency they want. And, second, because RCA pays your going rate for warranty service rendered. Sound good? For details, read on.

RCA



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AccuColor Parts and Labor Basic Warranty Provisions. For **one full year** from the date of purchase, RCA Corporation warrants to the first retail purchaser that it will pay all labor charges for repair of defects in 100% solid state AccuColor models (**90 days** on AccuColor models with "New Vista" chassis) and will make available replacements for any defective parts. (If the picture tube becomes defective within **two years,** it will be exchanged for a rebuilt picture tube.) On portable models RCA will make available replacements for defective parts and pay labor charges only on a "carry-in" basis; transportation to and from the service agency is the purchaser's responsibility. Installation and set-up, foreign use, antenna systems, and adjustment of customer controls are not included. To obtain warranty benefits, contact your RCA dealer or the service agency of your choice with your Warranty Registration Card.

For a copy of the PS booklet which covers all of our products, and the name of your field representative, write RCA Sales Corporation, Dept. 634, 600 N. Sherman Drive, Indianapolis, Indiana 46201.

. . . for more details circle 119 on Reader Service Card

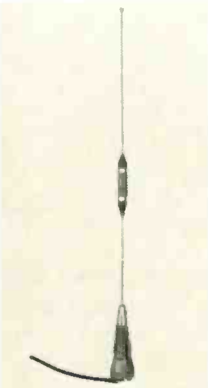
NEW PRODUCTS

For additional information on products described in this section, circle the numbers on Reader Service Card. Requests will be handled promptly.

MOBILE ANTENNA 703

Solves car wash leakage problems

A UHF mobile antenna, Model ASP660, is said to come with a completely waterproof base connection. Rated for 5dB gain, the 450MHz antenna is reportedly designed to permit quick removal of the entire spring, phasing coil and whip assembly, leaving the loading coil and mount, which can be fully immersed in water without shorting. The phasing coil is also said to be an integrated, molded unit, impervious to weather and even extreme abrasion. The manufacturer indicates that the antenna is available in six different mounting configurations including quick grip (trunk lip mount), cowl mount, magnetic mount, and conversion models for Motorola, GE, RCA and other Antenna Specialists standard base mounts. Antenna Specialists.



TWO-WAY SPLITTER 704

Special bushing speeds MATV installation

A new two-way, 82 channel hybrid Coloraxial splitter has been developed with a special bushing for the convenient, fast, permanent installation of MATV systems. Designed for use without cable connectors, the signal splitter reportedly accepts cable sizes from RG-59 through RG-6. The bushing comes sized for the RG-59 cable. An expansion tool, ET-659, is supplied to expand the cable bushing for CAC or CAC-6 cable size. The 1563 splitter is said to have a splitting loss rated at 3.5dB for VHF and 3.8dB for UHF, with 18dB isolation between outputs and a frequency range of 54 to 890MHz. List price per unit is $6.95. Jerrold.

COLOR-TV CONTROLS 705

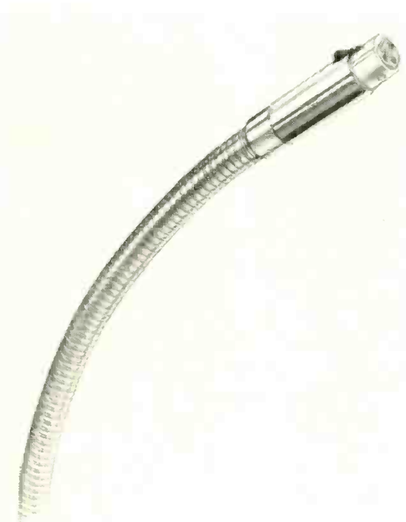
Controls boxed and cross-referenced

A method of inventory for stocking the controls needed for color-TV servicing has been developed. Each box contains a cross-reference for the TV set manufactured, inventory record of individual controls and a complete cross-reference of color TV controls for all manufacturers. Each manufacturer will have its replacement controls packaged and indexed in standard inventory boxes such as RCA's controls contained in 2 boxes with a total of 20 controls, Zenith's controls contained in 3 boxes with a total of 30 controls, Motorola's controls contained in 3 boxes with a total of 30 controls, Admiral's controls contained in 2 boxes with a total of 20 controls, and Sears' controls contained in 2 boxes with a total of 20 controls. Controls included are convergence, audio, focus, color sensitivity, AGC delay, brightness, vertical and horizontal centering, horizontal frequency and vertical linearity. Workman Electronic.

AUDIO CONNECTOR 706

Available in three, four and five contact configurations

An audio connector, Model P(3)F, has an internal thread (5/8-27 NS-2B) on one end of the shell which is said to permit it to be screwed directly onto a gooseneck or stems for easy microphone mounting or dismounting. After the connector is attached, the microphone is plugged into the other end. Mounting and mating are reportedly accomplished simultaneously. Connectors are available in three, four and five contact configurations. The connector includes the ground terminal, ground contactors and captive-design insert screw. Switchcraft.



POWER SUPPLY 707

Output current is rated at 100μa

A regulated, miniature, solid-state, high-voltage dc power supply, Model RM12P, features an output voltage rated from 10 to 12Kv and a output current rated at 100μa. Other features reportedly include a fully enclosed shielded metal case, price line and load regulation and 0.1% rms ripple. This model is said to have positive polarity with respect to ground (case). The unit measures 3¼ in. by 5½ in. by 1½ in. Spellman.

continued from page 45

throughout the system.

To calculate distribution system losses, you will have to consult manufacturer's literature. Do not, however, make the mistake of calculating losses for VHF channels. Losses (especially cable losses) increase with frequency. Since you want the system to be capable of distributing UHF signals as well as those in the VHF range, calculate your losses for the higher frequencies.

Let us look at Fig. 4 and calculate its distribution system loss.

Splitter Losses

1 two-way splitter	= 4dB
1 four-way splitter	= 8dB

Tapoff Through Losses

(Multiply the through loss of one tap times the number of tapoffs) 1.5dB through loss × 6 tapoffs	= 9dB

Tapoff Isolation Loss

Isolation loss of tapoff at end of line only	= 12dB

Matching Transformer

Signal lost	= 1dB

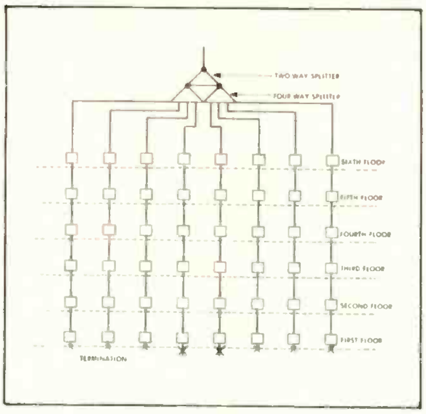


Fig. 4—A six-story building with eight tapoffs.

Cable Loss

150 ft of cable × 6dB per 100 ft	= 9dB
Total Distribution Loss	= 43dB

Notice that we have added all of the losses between the head end and a tapoff at the end of one trunkline. We could repeat this for the other seven trunklines, but none would show any greater loss. Similarly, if we chose a tapoff at the middle of a line, losses to this point would be less than what we have called "total distribution loss."

We laid out the distribution system and calculated its losses first since we need this information to plan our head end intelligently. Our next article will go back to the head end and discuss criteria for choosing antennas, amplifiers and other head end equipment. ■

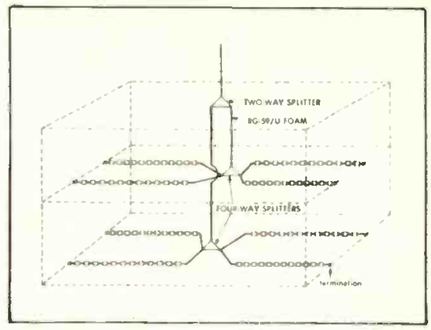


Fig. 5—A typical distribution system for schools, hotels and hospitals.

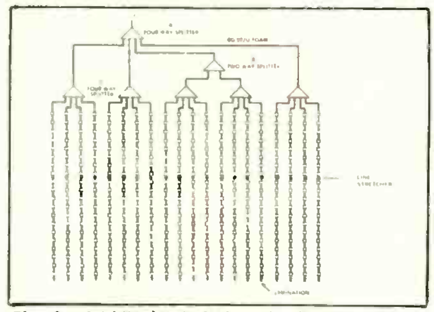


Fig. 6—A high-rise building distribution system.

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Model 801
$210

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2. **High sensitivity — 5 mV AC full scale at 10 megohm input impedance; 50 mV DC at 11 megohm input resistance.**
3. **Simplified scale — 8" meter with only 4 arcs for all 73 ranges.**

It offers 73 measurement ranges including 8 low-power resistance ranges that apply only 35 mV to the device under test . . . does not activate or damage solid-state components. With full-scale readings as low as 50 mV DC and 5 mV AC, 5 μA DC and 100 Ohms (1 Ohm center-scale) — plus a 10 megohm input impedance on the AC scales and 11 megohm input resistance on DC — Triplett's Model 801 V-O-M is ideally suited to in-circuit testing. When you add 2% DC and 3% AC accuracy on the voltage ranges (current: 3% DC and 4% AC) and a 25 μA suspension-type meter with a nearly 7½" scale length, there's no doubt that the Model 801 has no equal among analog V-O-M's in terms of sensitivity and versatility.

See the remarkable Model 801 V-O-M — priced at $210 — at your Triplett distributor. For more information—or for a free demonstration—call him or your Triplett sales representative right away. Triplett Corporation, Bluffton, Ohio 45817

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The material used in this section is selected from information supplied through the cooperation of the respective manufacturers or their agencies.

RCA SALES CORP.

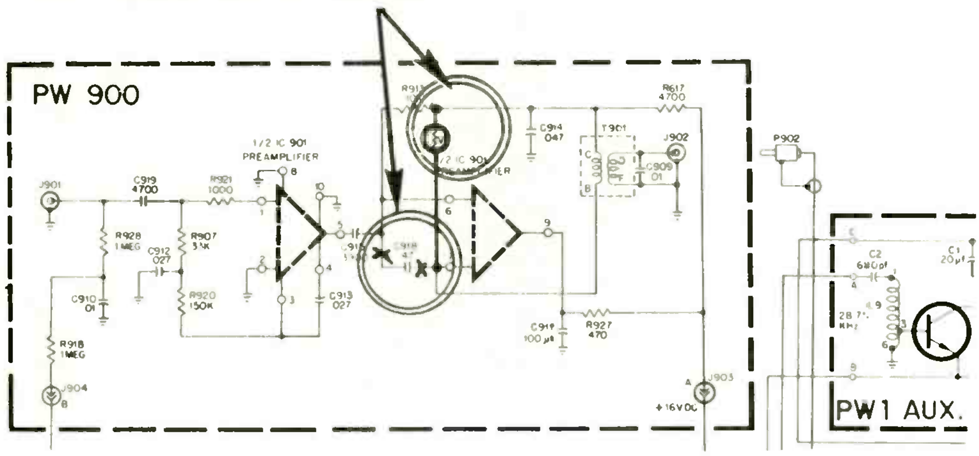
Remote Preamplifier Model CTP13A—Marginal Sensitivity

Some versions of the PW900 board utilized in the CTP 13A remote amplifiers may have a circuit modification. As shown in the schematic, capacitor C918 is deleted and a varistor (Stock No. 130042-7) is added in parallel with the primary of transistor T901.

Physically, the varistor replaces the capacitor. The printed circuit is modified slightly in order to make the proper connections.

Marginal remote sensitivity in amplifiers that have been modified may be improved by removing the varistor. It is not necessary to replace the capacitor unless high-frequency interference is evident in the picture during remote functions.

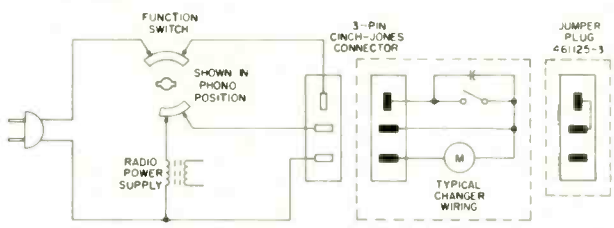
Capacitor replaced with varistor



MAGNAVOX

Jumper Plug for Operating Component-Type Radio Tuner with Non-Compatible Record Changer

As indicated in the diagram, the primary power circuit of most Magnavox radio tuners is designed to provide power to the motor of a compatible record changer, and also to allow the ON/OFF and automatic shut-off functions of the record changer to control the application of power to the radio unit when the PHONO function is selected. The power and control functions are routed between the radio and record changer through a 3-pin Cinch-Jones connector mounted to the rear of the radio unit.



If a non-compatible changer is to be used with a Magnavox component radio unit, it must be powered from a source other than through the radio function switch. Under this condition, ac power cannot be controlled by the changer switch; and a direct connection must be made between two pins of the 3-pin connector on the radio to allow power to be applied to the radio power supply when the function switch is in the PHONO position. A jumper plug with an internal short between the appropriate two pins, Part No. 461125-3, is available from your Magna-Par Branch.

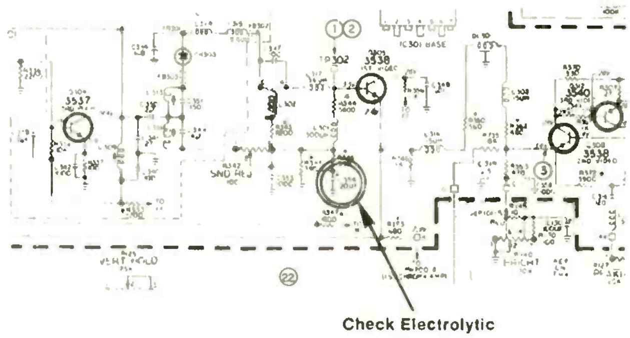
COLORFAX

The material used in this section is selected from information supplied through the cooperation of the respective manufacturers or their agencies.

RCA SALES CORP.

Color TV Chassis CTC40, 44, 47—Distorted Video and/or Marginal Sync

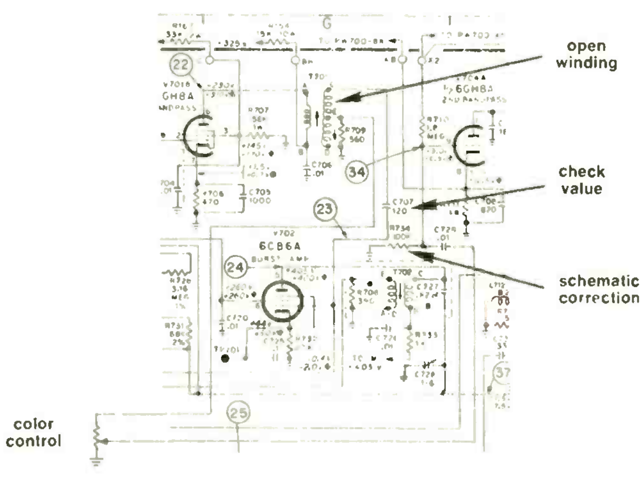
A wide variety of video and/or sync symptoms in these chassis may be the result of an electrolytic capacitor (a



20μf 15v electrolytic, RCA stock No. 121995) changing value. Possible symptoms include: video "smear"; video "bends"; unstable sync; or various combinations of these symptoms. In addition, the symptom may vary with the brightness control setting.

Color TV Chassis CTC 38, 39—Color Sync

Some symptoms associated with the color sync and/or ACC-killer circuitry in TV sets utilizing these chassis may be the result of an open winding in the first bandpass transformer, T701 (Stock No. 124761). If the open occurs in



the winding connected between terminals C and E, the color signal input to the burst amplifier stage will be incorrect. However, the path for chroma input to the second bandpass amplifier stage will be normal.

In addition, make certain capacitor C707 is the correct value (120pf).

The schematic correction pertains to Service Data 1970 No. T3 only.

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DEALER SHOWCASE

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STEREO CASSETTE RECORDER 708

Forms an attache case size package

A recorder, Model CF-610, is said to consist of an AM/FM stereo radio, stereo control center and a pair of extended-range speaker systems. The

unit reportedly offers a tape select switch for both standard cassettes and new high performance chromium dioxide cassettes, volume and tone control. Other features reportedly include a magnetic phono, auxiliary and microphone inputs, telescopic FM antenna, recording control, three-digit tape counter and stereo headphone monitor jack. The cabinet is made of plastic and leather-grained vinyl. The speakers and control center latch together to form a single, attache case size package. Price $289.95. Superscope.

INTERCOM SYSTEM 709

Packaged in colored blister pack

The Two Station Intercom, Model B1100, packaged in a blister pack, can be mounted on a wall, or placed on a desk or counter. The remote unit is designed to permit hand-free operation. The manufacturer indicates that

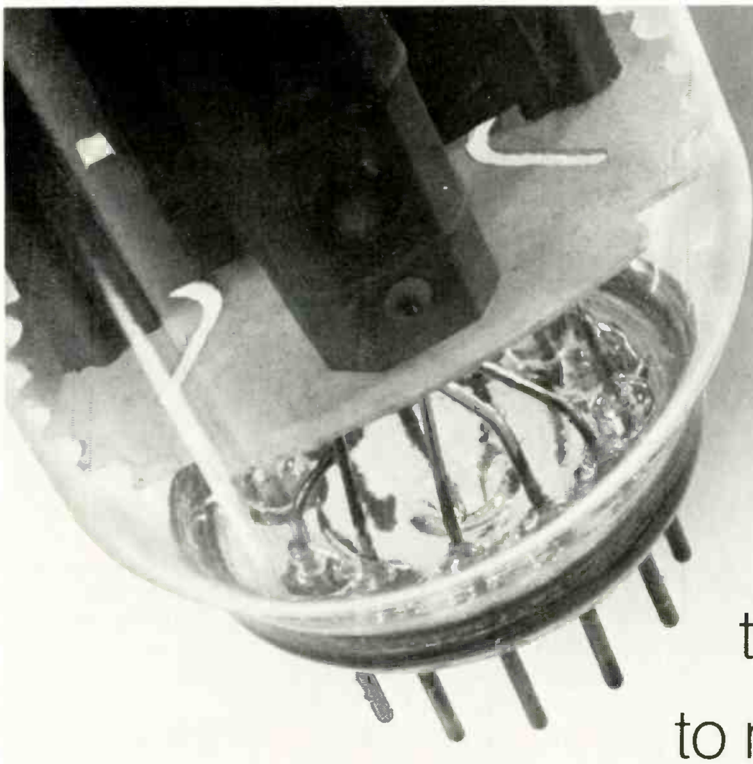
the transistorized amplifier assures good volume, distortion free performance and high sensitivity. IE Manufacturing.

TABLE MODEL COLOR-TV SET 710

Signal seeking tuning provided on the UHF band

A 19-in. table model color-TV set, Model CX87WR, is said to include an 82-channel chairside color control designed for signal seeking on the UHF band. The receiver also has a color bright 85 picture tube, which combines brightness and high contrast for the sharpest picture. In addition, it has

continued on page 66



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continued from page 52

growing library. Management personnel appear frequently before the TV camera in order to explain to their staff company policies and procedures.

The two production studios are separated by a folding door so that the larger area can be used whenever necessary. The preview studio, used mostly by company personnel to rehearse speeches, contains two ceiling-mounted TMC-2100 cameras, one equipped with a remote-controlled zoom lens.

Control equipment includes a TeleMation TPS-12X3 Video Switcher, TSE-100A Screen Splitter and a stairstep generator for testing video at 22 stations in five Boston Telco buildings. The complete system was engineered and installed by Lake Systems Corp.

Large-Screen Video Projectors

Too frequently we consider these CCTV applications as being limited to those using several relatively small monitors. This, however, need not be the case. One of the many color-TV projectors currently on the market is the Model No. TV-700 Tele-Vue System. According to A. R. Pignoni, vice-president of Display Sciences, it is the brightest Schmidt optical system on the market (1000 lumens peak light output) designed for a 15- by 20-ft optimum screen size.

He says that the TV-700 has served mainly in the entertainment field, bringing to the screen televised events such as boxing (Clay/Quarry at Madison Square Garden), hockey (Detroit Red Wings, Stanley Cup Playoffs), football (Michigan State and Michigan State University) and theater presentations ("Oh! Calcutta"), as well as auto races, soccer, rock festivals and other programs attracting large audiences.

Conclusion

The CCTV applications included in this article "merely scratch the surface." With such unlimited possibilities, there are many potential applications right in your area—representing a market that can substantially increase your future revenue. ■

DEALER SHOWCASE

continued from page 64

a hybrid chassis, assuring a picture seconds after the set is turned ON. This model is said to also include automatic fine tuning, lighted channel indicators, and variable tone control. Manufacturer's suggested list price is $499.95. Sylvania.

TECHNICAL LITERATURE

For additional information on products described in this section, circle the numbers on Reader Service Card. Requests will be handled promptly.

Tools 400

Catalog 470, "Tools for Electronic Assembly and Precision Mechanics," is a 72-page handbook-size catalog of particular interest to electronic technicians. Over 1700 individual items are offered and described. Section headings include screwdrivers, wrenches, pliers, tweezers, files, shears, knives, microtools, relay tools, tool kits, power tools, metalworking tools, wire strippers, soldering equipment, lighting and optical equipment, work holders, and miscellaneous apparatus. A solder section lists tin-lead alloys which conform to Federal Specifications QQ-S571-D, as well as eutectic alloys, copper-bearing solders, coreless solders, bar solders, silver-bearing solders, aluminum solders, low melting-point solders, and high melting-point solders. Another important feature of the new catalog is the inclusion of four pages of technical data on tool selection. Jensen Tools & Alloys.

Fuses 401

A 16-page booklet shows what each fuse protects, the proper fuse to use and where the fuse is located for the protection of radios, tape decks, stereos and many other electrical/electronic automotive accessories. The information covers all 1971 models of cars and trucks, as well as older models for 12 model years back. Bussman Manufacturing.

DC Restorer Diode 402

A data sheet has been prepared which includes both the physical and electronic specifications for a dc restorer diode, part no. D431-F. Specifications indicate that it has a 3ms rise time, though capable of handling certain currents as high as 50a. IR.

CCTV Catalog 403

This loose leaf general purpose catalog on CCTV gear contains information on cameras, monitors, vidicons, and lenses, accessory equipment, mountings and housings, general information and price lists. Also included are applications for CCTV. GBC TV Corp.

Radio and TV Components 404

A 1971 catalog, No. 100, of replacement components for radios and TV sets consists of 64 pages of resistor fusing devices, circuit breakers, convergence controls, service accessories, electronic chemicals, audio cables, adapters for hi-fi and cassette type recorders, battery holders and prototype kit components. Workman.

Sound Equipment 405

A 32-page 1971 Sound products catalog contains 180 items related to the electronics and sound industries. These include speakers, speaker enclosures, speaker systems, trumpet and reflex horns, mobile amplifier, commercial amplifier and audio accessories. Components Specialties.

Test Instruments 406

The all-line test equipment catalog, No. 57-T, featuring digital VOMs provides any technician with the right tester for his needs. A comprehensive, easy-to-read indexed catalog is well illustrated and technically details each of the models featured. Single unit prices are provided for each model as well as accessories: replacement leads, RF probes, high-voltage probes, leather carrying cases, tester stands, external shunts and others. The complete list of its sales organizations and service modification centers is also given. The catalog is three-hole punched for easy replacement into a standard reference binder. Triplett.

Sound System Components 407

A six-page catalog gives detailed specifications and descriptions of a broad line of commercial sound components and special purpose sound system products. Designed for insertion into standard catalog binders, the double-fold catalog covers a wide array of sound system products including amplifiers, tuners, boosters, mixers, turntables and record changers, carrying cases and cabinetry. Complete specifications and photographed configurations are included for the Carillon Series; the TPA (Transistorized Power Amplifier) Series; and the SLA Series of automatic limiting amplifiers. Bell P/A.

Power Transistors 408

A six-page power transistor brochure, No. CB124, covers encapsulated silicon power transistors. A chart lists electrical parameters for each device and arranges them by NPN or PNP construction. Also included is a cross-reference guide listing industry transistor part numbers. Texas Instruments.

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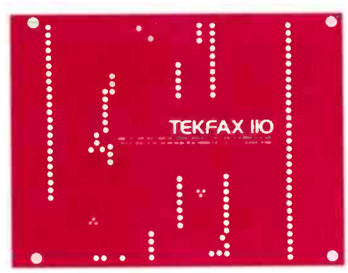

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