MNR. 37/4

Ormiston

Instruction Manual

for

MARCONI MARINE

APOLLO GP/SSB RECEIVER

DRAWINGS

Handbook Ref. R50/4
3rd Edition, February 1977

Published by
Technical Information Section
THE MARCONI INTERNATIONAL MARINE CO. LTD.
Elettra House, Chelmsford, Essex

MANUAL
FOR
MARCONI MARINE
APOLLO
RECEIVER

DRAWINGS

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(incorporating Amendment No. 1)

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POST DEVELOPMENT CHANGE RECORD SHEET

Post Development Changes to the Apollo receiver may necessitate amendments to the information contained in this handbook. Such amendments will be issued with the items required to effect a particular change. After inclusion of the necessary amendments in the handbook the appropriate change number or letter should be struck off the label below.

1	3	5	7	9	11	13	15	17	19	21	23
2	4	6	8	10	12	14	16	18	20	22	24
A	B	C	D	E	F	G	H	J	K	L	M

The Change State of any unit is dependent upon the Serial Number of that unit. Where this handbook is supplied as part of an installation, the Change State of the unit should be ascertained from the label affixed to the unit, and the appropriate numbers and letters struck off the label reproduced above.

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SECTION 2 TECHNICAL DESCRIPTION

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(to be issued later)

SECTION 4 DRAWINGS

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UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND

Certificate of Type-Testing of a Main Radio Receiver

A specimen of a main radio receiver manufactured by The Marconi Company Limited and described by the manufacturer as the APOLLO Type N2050 has been examined and tested.

The Board of Trade and the Ministry of Posts and Telecommunications are satisfied, subject to the terms of the covering letter, that the specimen examined and tested meets the requirements of Part II of Schedule 2 to the Merchant Shipping (Radio) Rules 1965 and the requirements of Schedule 4 to the said Rules as are applicable to Class B equipment.

The Ministry of Posts and Telecommunications is additionally satisfied that the specimen examined and tested meets :-

1. the Performance Specification for a Main Radio Receiver 1964 ;
2. the relevant receiver sections of the Performance Specification for a Single-Sideband Radio Equipment for use in Ships fitted for Radiotelephony in the band 1605-3800 kHz (TSC 105) 1968 ;
3. the Performance Specification for a High-Frequency Single-Sideband Radiotelephone Receiver (TSC 102) 1968.

It is a condition that the receiver referred to in 2 above is installed only in vessels that carry a qualified radiotelegraph operator.

Dated at the Ministry of Posts and Telecommunications this 6th day of August 1970.

G A Chambers

A Senior Executive Engineer of the Ministry of Posts and Telecommunications.

Dated at the Board of Trade this 6th day of August 1970.

J. S. Rowe

for the Board of Trade.

TECHNICAL SUMMARY

1. GENERAL

The Apollo is designed for use as a ship's main receiver. It meets all the requirements for maritime operations, including the extensive use of SSB, teleprinter services to ships and selective calling. The receiver is designed for inclusion in a comprehensive transmit/receive system, with one or more transmitters.

The design is fully solid state and includes field-effect transistors and integrated circuits. Modular construction is employed to facilitate rapid servicing by unit replacement.

A single or double superheterodyne configuration is employed according to the frequency range selected. The receiver incorporates a.g.c., muting, noise limiting and b.f.o. facilities, all controlled from the front panel. Protection is afforded against breakthrough from adjacent transmitters.

1.1. Tuning Frequency Indication

The receiver employs a digital counter to indicate, directly, the frequency to which the receiver is tuned. This method permits far greater accuracy in the setting of the receiver frequency than is possible with conventional scale techniques. In addition, no scale calibration is required. The counter can be used to measure the frequency of a received signal.

1.2. Local Oscillators

For general purpose use, a local oscillator is provided which covers the entire frequency range, between 15kHz and 28MHz, in ten bands.

A high stability, ovened v.f.o. covers the maritime bands. This section is intended primarily for use with SSB signals, where frequency stability is most important, but it can also be used with other signals in the maritime bands.

Provision is made for the use of an external local oscillation source such as an associated transmitter. The receiver tuning then follows the frequency of the transmitter and the frequency is displayed by the counter. This facility can only be used on the four highest frequency ranges.

1.3. Signal Classes

The receiver can operate with the following classes of signal:

A1	c.w. telegraphy
A2	m.c.w. telegraphy
A3	DSB telephony
A3A	SSB with reduced carrier
A3H	SSB with full carrier (compatible with A3, for reception)
A3J	SSB with suppressed carrier
F1	FSK

An appropriate i.f. bandwidth can be selected to suit each class of signal. Very narrow, narrow, intermediate and wide bandwidths are provided for classes A1, A2, A3 and A3H; these bands are symmetrical about the centre i.f. frequency. For SSB, classes A3A and A3J, the bandwidth is asymmetrical and selects the upper sideband. When an SSB bandwidth is selected, the a.f. demodulator and a.g.c. circuits are automatically set for SSB reception.

For F.S.K. (F1) reception, provision is made for injecting a beat frequency oscillation from an F.S.K. demodulator so as to obtain a suitable a.f. output.

1.4. Power Supplies

The receiver operates from a mains supply of 105 to 130V or 210 to 260V, 50 to 60Hz.

1.5. System Integration

Provision is made for the injection of a sidetone from an associated transmitter and for automatically desensitizing the receiver during trans - mission.

As noted previously, the receiver local oscillation can be derived from a transmitter.

The loudspeaker can be switched off from the transmitter during duplex radiotelephone transmission.

2. TECHNICAL DATA

2.1. Frequency range

General purpose (G.P.) 15kHz to 28MHz in ten bands as follows:

kHz	MHz
15 to 30	1·4 to 3·0
30 to 65	3·0 to 6·0
65 to 140	6·0 to 15·0
140 to 300	15·0 to 28·0
300 to 600	
600 to 1400	

High stability (maritime bands)

MHz
1·6 to 2·525
2·5 to 3·525
3·5 to 4·525
5·3 to 6·525
7·8 to 9·025
12·3 to 13·525
16·3 to 17·525
21·8 to 23·025

2.2. Intermediate frequencies	1·1MHz and 100kHz on h.f. (>1·4MHz) and 65 to 140kHz bands	
	100kHz only on other bands	
2.3. Signal classes received	A1	c.w. telegraphy
	A2	m.c.w. telegraphy
	A3	DSB telephony
	A3A	SSB with reduced carrier (-16dB)
	A3H	SSB with full carrier (compatible with A3)
	A3J	SSB with suppressed carrier
	F1	FSK

2.4. Local oscillation (first mixer drive) sources (selected by G.P./H.S./EXT switch):

General purpose (G.P.) oscillator covering the whole range from 15kHz to 28MHz

High stability (H.S.) oscillator covering the maritime bands only.

External source such as associated transmitter. Frequency must be 1·1MHz above the receiver frequency. Only the four highest frequency ranges can be used with this source.

2.5. Digital frequency display

Resolution	±100Hz for search tuning, using six digits
	±10Hz for accurate setting. Only the three least significant digits are displayed
Display period	Long. 10 seconds nominal
	Medium. 1 second nominal
	Short. 100ms nominal (available only with ±100Hz resolution).

2.6. Ancillary logging scales — Both G.P. and H.S. tuning controls have logging scales. Each scale has 5000 divisions.

2.7. Beat frequency oscillation (demodulator drives) — Variable from 98·4 to 99·6kHz, giving an a.f. output of 400 to 1600Hz.

Fixed 100kHz: Used for measuring the frequency of an incoming signal by obtaining the zero beat via the loudspeaker.

External source. 98·5MHz from demodulator for F1 (FSK) operation.

2.8. Automatic gain control For A1, A2, A3 and A3H signals: — standard, carrier-derived a.g.c. with charge and discharge times suitable for radiotelephone operation.

For A3A and A3J (SSB) signals: sideband+carrier-derived, pedestal-type a.g.c. designed to maintain the gain at a constant level despite breaks in speech etc. When the transmission ceases, the gain level is held for a short (0·5sec) or long (1·5sec.) period, as selected at the front panel.

The a.g.c. can be switched off.

2.9. Frequency stability

2.9.1. General purpose local oscillator:

Five minutes after switch-on: above 1600Hz, better than one part in 10^4 per 15 min.

below 1600Hz, typically better than three parts in 10^4 per 15 min. period

$1\frac{1}{2}$ hours after switch-on: 3 parts in 10^5 per 15 min., typical

3 hours after switch-on: 1 part in 10^5 per 15 min., typical

2.9.2. High stability local oscillator: Better than 5Hz per hour, typical, with oven continuously energised.

2.10 High stability fine tuning (CLARIFIER): Tuning rate not greater than 2Hz per degree

Frequency range ±250Hz maximum

2.11 Selectivity: The following figures are typical:

Signal Classes	Bandwith	Rejection	Remarks
A1, A2, A3, A3H	Very narrow f ±150Hz	30dB at ± 350Hz	B.F.O. available for A1.
	Narrow f_o±750Hz	30dB at ±1500Hz	Carrier-derived a.g.c. selected
	Intermediate f_o±2250Hz	30dB at ±3250Hz	
	Wide f_o±5000Hz	30dB at ±7500Hz	
A3A, A3J	SSB f_o +2700Hz −100Hz	50dB at +3100Hz	100kHz i.f. re-inserted Sideband-derived a.g.c. selected
F1	Very narrow f_o±150Hz (f_o = i.f. centre frequency = 100kHz)	30dB at 350Hz	

The figures for the intermediate and wide bandwidths are approximate since, at the lower frequencies, the response is modified by the increasing effect of the r.f. tuned circuits.

2.12 **Sensitivity**

The signal input level required to provide a given signal-to-noise ratio on each range is less than the following:

Range	Signal Class	Bandwidth	S/N Ratio	Signal level e.m.f. rel. 1μV
kHz			dB	dB
15 to 30	A1	Narrow	10	30
30 to 65	A1	Narrow	10	30
65 to 140	A1	Narrow	20	30
140 to 300	A1	Narrow	20	29
300 to 675	A1	Narrow	20	20
675 to 1400	A3	Wide	10	30
MHz				
1·4 to 3	A3A, A3J	SSB	20	16
3 to 6	A3A, A3J	SSB	20	10
6 to 15	A3A, A3J	SSB	20	10
15 to 28	A3A	SSB	20	10

2.13 Aerial input impedance: 75Ω, approximately, at frequencies greater than 1MHz.

2.14 A.F. Outputs: 1 to 2W into external or internal loudspeakers

10mW into low impedance headphones.

600Ω output available.

2.15 Power supply

Voltage	105 to 130V or 210 to 260V mains	
Frequency	50 to 60Hz	
Power Requirements	At switch-on	After Approx. ½ hour
Oven and oscillators only	50W	22W
Receiver on	86·5W	58W
Receiver and counter on	90W	62W

2.16 System integration

2.16.1. Receiver desensitising input from transmitter

	E.M.F.	+15 to +30V d.c.
	Source impedance	≤5 kilohm
	Input impedance	50 kilohm
	Switching	E.M.F. on when Transmit/receive switch is set to transmit

2.16.2. Sidetone input from transmitter

	E.M.F.	1/3 to 40V r.m.s.
	Frequency	≅1kHz
	Source impedance	≤300 kilohm
	Input impedance	120 kilohm

2.16.3 Local oscillation input from transmitter

	Frequency	1·1MHz above signal frequency (for signals >1·4MHz only)
	E.M.F.	>100dB ref 1μV (100mV r.m.s.)
	Input impedance	1kΩ

2.16.4. Loudspeaker connection and switching — See circuit diagram for Unit 1

2.16.5. External b.f.o. for F1 (FSK) operation

	Frequency	98·5kHz for 1·5kHz a.f. centre frequency output
	E.M.F.	>400mV r.m.s.
	Input impedance	120Ω

2.16.5. I.F. output for monitoring

	Frequency	100kHz i.f.
	E.M.F.	70mV for a standard input signal with a.g.c. on
	Source impedance	50Ω

SECTION 4

DRAWINGS

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R.50/4

PART I

Master Components List
for
Apollo G.P./S.S.B. Receiver
N-01-2050-01

The following abbreviations are used throughout this Master List:

alt.	Alternative
cer.	Ceramic
comp.	Composition
dia.	Diamond
electro.	Electrolytic
enam.	Enamelled
ins.	Insulated
lin.	Linear
mech.	Mechanism
met.	metallised
min.	Miniature
perm.	Permeability
plycarb.	Polycarbonate
plysty.	Polystyrene
trans.	Transformer
tub.	Tubular
var.	Variable
vit.	Vitreous
w.w.	Wire Wound

Please quote all available information when ordering spares. FAILURE TO DO SO WILL CAUSE DELAY IN DELIVERY.

MCL No.	Description	Standard Identity	Qty.	A/c. No.
	CAPACITORS			
1	High perm. 0·01μF -20 +80% 250V a.c. T.C.C. Ltd. Lemco.	PC.18207/7	4 *	CR.6128
2	High perm. 0·0047μF -20 +80% 500V T.C.C. Ltd. Lemco.	PC.18207/5	3	CR.5108
3	14 - 546pF two gang	O/D PC.20035/2	1	CRV.136
4	14 - 546pF three gang	O/D PC.20034/1	1	CRV. 73
5	Cer. 0·0022μF -20 +80% 500V T.C.C. Lemco	PC.18207/3	2	CR.4733
6	Plysty. 680pF ±2·5% 125V Salford Elec.	PC.19614/2	2	
7	Plastic (Plycarb) met. insul. 0·1μF ±20% 100V d.c. S.T.C. PMF Mullard 344-2	O/D PC.19655/7	87	
8	Plastic (Plycarb) met. insul. 0·047μF ±20% 100V d.c.	O/D PC.19655/5 alternatively O/D PC.19893/4	36	
9	Plysty. 0·0027μF ±2·5% 125V Salford Elec.	PC.19614/43	3	
10	Mica 43pF ±1pF 350V Lemco MS.611	PC.18817/16	1	CR.1731
11	Mica 270pF ±2% 350V Lemco MS.611	PC.18803/35	3	CR.3123
12	Plycarb. 0·47μF ±20% 100V d.c. STC Mullard	O/D PC.19655/11	7	CR.7154
13	Plysty. 0·001μF ±2·5% 350V Salford STC	PC.19502/97	1	CR.4550
14				
15	Plysty. 56pF ±2pF 125V Salford type PF	O/D PC.19540/28	1	
16	Plysty. 470pF ±2% 125V d.c. GEC type PF	PC.19566/1	3	CR.3623
17	Plysty. 390pF ±2% 125V d.c. GEC type PF	PC.19566/27	4	CR.3423
18	Plysty. 10pF ±1pF 350V Salford	PC.19502/1	3	CR.1022

* On equipments with change letter 'A' crossed off, Item No. 3 is CC.166007, Account No. CRV.137 and Item No.4 is CC.166008, Account No. CRV.138.

MCL No.	Description	Standard Identity	Qty.	A/C. No.
	CAPACITORS cont.			
19	Variable 3 - 30pF Mullard	PC.20010/2	38	CRV.101
20	Plysty. 56pF ±2pF 350V d.c. Salford	PC.19502/10	19	CR.1908
21	Plysty. 33pF ±2pF 350V d.c. Salford S.T.C.	PC.19502/7	16	CR.1519
22	Plysty. 100pF ±2pF 350V Salford, STC	PC.19502/13	8	CR.2423
24	Plysty. 120pF ±2·5% 350V Salford.	PC.19502/86	1	CR.2210
25	Plysty. 47pF ±2pF 350V d.c. Salford	PC.19502/9	7	CR.1716
26	Mica 300pF ±2% 350V d.c. Lemco type MS.611	PC.18803/36	4	
27	Plysty. 5pF ±1pF 125V Salford type PF	O/D PC.19543/59	2	CR.0510
28	Plysty. 180pF ±2·5% 125V d.c. GEC type PF	PC.19614/32	1	CR.2814
29	Plysty. 330pF ±2·5% 125V GEC type PF	PC.19614/12	3	CR.3317
30	Plysty. 68pF ±2pF 350V d.c. Salford	PC.19502/11	20	CR.2014
31	Plysty. 150pF ±2·5% 125V d.c. GEC type PF	PC.19614/33	1	CR.2735
32	Plysty. 470pF ±2·5% 125V Salford	PC.19614/1	3	
33	Plysty. 270pF ±2·5% 125V d.c. G.R.C. type PF	PC.19614/31	1	CR.3114
34				
35	Mica met. 430pF ±2% 350V d.c. Lemco type MS 611	PC.18803/40	1	CR.3620
36				
37	Electro. 1µF ±20% 35V d.c. Plessey TCC STC	PC.18415/1	15	
38	82pF ±2pF 350V Plysty.	PC.19502/12	11	CR.2210
39	Plycarb. 0·22µF ±20% 100V STC PMF Mullard 344 - 2	O/D PC.19655/9	6	

MCL No.	Description	Standard Identity	Qty.	A/C. No.
	CAPACITORS cont.			
41				
42	Plysty. 0·0018μF ±2% 125V d.c. GEC type PF	PC.19566/16	3	
43	Plysty. 0·001μF ±2½% 125V d.c. Salford STC	PC.19614/3	8	
44	Plysty. 22pF ±2pF 350V d.c. Salford	PC.19502/5	1	CR.1315
45	Plysty. 27pF ±2pF 350V d.c. Salford	PC.19502/6	5	CR.1335
46	Plysty. 390pF ±2·5% 125V GEC type PF	PC.19614/30	1	CR.3423
47	Plysty. 15pF ±2pF 350V Salford	PC.19502/3	6	CR.1111
48	Plysty. 330pF ±2·5% 350V Salford, STC.	PC.19502/91	2	CR.3315
49				
50	Plysty. 12pF ±2pF 350V d.c. Salford	PC.19502/2	3	CR.1121
51	Cer. 0·01μF -20 +80% 250V Erie type CD 801P	C/D PC.216161/1	17	
52				
53	Plysty. 220pF ±2·5% 125Vd.c. GEC type PF	PC.19614/6	1	CR.3020
54	Plysty. 52pF ±1pF 350V d.c. GEC type PF	PC.19502/80	1	
55	Plysty. 0·0015μF ±2·5% 125V GEC PF	PC.19614/7	2	
56	Plysty. 39pF ±2pF 350V d.c. Salford	PC.19502/8	3	CR.1514
57	Plysty. 0·0039μF ±2% 125V d.c. GEC type PF	PC.19566/18	1	
58	Plysty. 820pF ±2·5% 125V d.c. GEC type PF	PC.19614/25	1	CR.4313
59	Plysty. 0·0033μF ±2·5% 125V GEC type PF	PC.19614/8	2	

MCL No.	Description	Standard Identity	Qty.	A/C No.
	CAPACITORS cont.			
61	Cer. 9·8pF ±0·5pF 500V d.c. Erie style AD type N2200	O/D PC.216168/1	2	
62	Mica 0·0056μF ±5% 200V Lemco MS.139	O/D PC.18663/2	1	
63				
64	Plysty. 820pF ±2% 125V d.c. GEC type PF	PC.19566/13	1	CR.4313
65	Plysty. 0·0015μF ±2% 125V d.c. GEC type PF	PC.19566/44	1	
66	Plysty. 0·0033μF ±2% 125V d.c. GEC type PF	PC.19566/24	1	
67	Mica met. 62pF ±2% 350V d.c. Lemco MS.611	PC.18803/20	1	
68	Mica met. 220pF ±2% 350V d.c. Lemco type MS.611	PC.18803/33	3	CR.3009
69	Plysty. 0·001μF ±2% 125V d.c. GEC type PF	PC.19566/3	1	CR.4543
70	Mica 0·0068μF ±5% 200V Lemco MS.139	O/D PC.18663/1	1	
71	Plycarb. 1μF ±20% 100V STC pmf, Mullard 344 - 2	O/D PC.19655/13	8	
72	Mica met. 160pF ±2% 350V d.c. Lemco type MS.611	PC.18803/30	4	
73	Ceramicon 18pF ±10% 500V d.c. Erie	O/D PC.18234/3	4	
74	Mica met. 68pF ±2% 350V d.c. Lemco type MS.611	PC.18803/21	1	
75	Plysty. 560pF ±2·5% 125V d.c. GEC type PF	PC.19614/29	1	CR.3822
76				
77	Mica met. 0·0015μF ±2% 350V d.c. Lemco MS.611	PC.18803/53	9	
78	Ceramicon 150pF ±10% 500V d.c. Erie	O/D. PC.18233/4	7	
79	Mica 10pF ±1pF 350V d.c. Lemco MS.611	PC.18817/1	2	

MCL No.	Description	Standard Identity	Qty.	A/C. No.
	CAPACITORS cont.			
81	Plysty. 0·0047μF ±2·5% 125V d.c. GEC type PF	PC.19614/9	3	
82	Plycarb 0·01μF ±20% 100V STC PMF, Mullard 344 - 2	O/D PC.19655/1 alt O/D PC.19893/1	17	CR.6196
83				
84	Plysty. 0·0022μF ±2·5% 125V GEC type PF	PC.19614/37	1	CR.4740
85	Plycarb. 0·022μF ±20% 100V STC PMF Mullard 344 - 2	O/D.PC.19655/3 alt O/D PC.19893/6	7	
86	Electro. 6·8μF ±20% 35V d.c Plessey Texas Dubilier Solid Tantalum	PC.18415/6	5	
87				
88	Solid Tantalum 22μF ±20% 35V Plessey TCC Texas Dubilier	PC.18415/9	1	
89	Fixed Electro. insul. Solid Tantalum 10μF ±20%35V	PC.18415/31	1	
90	Electro. insul. Solid Tantalum 2·2μF ±20% 35V.	PC.18415/24	1	
91	Electro. min. 50μF -10+ 50% 40V.	O/D PC.19414/3	2	
92	Plysty. 0·0047μF 5% 125V - GEC STC	PC.19501/7	3	CR.5115
93				
94				
95	Electro. 250μF -10 +50% 40V Mullard	O/D.PC.19439/9	3	
96				
97	Plysty. 100pF ±2% 125V d.c. Salford	PC.19566/147	1	
98	120pF ±2% 125V d.c. Plysty.	PC.19566/8		
99	Cer. 0·001μF -20 +40% 500V Erie CD 801P	O/D PC.216162/1	11	
100	Plysty. 120pF ±2% 125V d.c. Salford	I/PC.19566/8	6	CR.2510

MCL No.	Description	Standard Identity	Qty.	A/C. No.
	CAPACITORS cont.			
101	Plysty. 150pF ±2% 125V d.c. Salford	I/PC.19566/19	1	CR.2735
102	Plysty. 0·0012μF ±2·5% 63V d.c. Salford type PF	O/D PC.216444/1	2	
103	Cer. 12pF ±½pF 750V d.c. Lemco	O/D PC.17781/1	3	
104	Cer. 2·2pF ±¼pF London Electrical 750V	O/D PC.18132/3	2	
105	Plysty. 240pF ±2% 125V d.c.	1/PC.19566/4	2	CR.3021
106	Cer. 1·8pF ±¼pF 750V d.c. London Electrical	O/D PC.18132/38	1	
107	Plysty. 180pF ±2% 125V d.c. Salford	1/PC.19566/5	3	CR.2814
108	4.3pF ±½pF 750V d.c. cer. London Electrical.	O/D.PC.18132/40	2	
109	Cer. 8·2pF ±½pF 750V d.c. Lemco	O/D PC.17781/2	2	
110	Cer. 5·6pF ±¼pF 750V d.c. London Electrical	O/D PC.18132/12	2	CR.1116
111	Cer. 18pF ±5% 750V d.c. Lemco	O/D PC.17783/2	2	
112	Cer. 3·9pF ±¼pF 750V d.c. London Electrical	O/D PC.18132/10	1	CR.1018
113	Electro. Tantalum 6·8μF ±20% 6V d.c. TCC Texas, Emihus Dubilier	PC.18415/5	3	
114	Radial min. met. mica 27pF ±1pF 350V d.c. Lemco type MS.611	PC.18817/11	1	
115	Plysty. 47pF ±2pF 125V Salford	PC.19540/27	1	CR.1722
116	Electro. Tantalum 15μF ±20% 20V d.c. TCC Texas Emihus Dubilier	PC.18415/7	2	CR.8522
117	Cer. 5·1pF ±¼pF 750V d.c. London Electrical	O/D PC.18132/39	1	
118	Radial min. met. mica 43pF ±1pF 350V d.c. Lemco MS.611	PC.18817/16	1	CR.1731
119	Cer. 8·2pF ±¼pF 750V d.c. London Electrical.	O/D PC.18132/14	2	

MCL No.	Description	Standard Identity	Qty.	A/C. No.
	CAPACITORS cont.			
120				
121	Disc. 0·001μF -20 +80% 500V d.c. TCC Lemco ceramic.	PC.18207/1	3	
122	Plysty. 390pF ±2·5% 350V d.c. Salford STC	PC.19502/92	1	CR.3412
123	Cer. 6·8pF ±½pF 750V d.c. London Electrical	O/D PC.18132/13	2	
124	Radial min. met. 750pF ±2% 350V Lemco MS.611	PC.18803/46	1	
125	Radial min. met. 1100pF ±2% 350V Lemco MS.611	PC.18803/50	1	
126	Radial min. met. 1040pF ±2% 350V Lemco MS.611	PC.18803/83	1	
127	Radial min. met. Mica. 0·001 μF ±2% Lemco MS.611 350V.	PC.18803/49	3	CR.4547
128	Radial min. met. mica. 82pF ±2% Lemco MS.611 350V.	PC.18803/23	1	
129	Glass 0·0022μF ±2% 500V d.c. Electrosil	O/D PC.17806/1	1	
130	Glass 0·0033μF ±2% 500V d.c. Electrosil Limited	O/D PC.17806/2	1	
131	var. 7-104pF ±2% Two gang SLC law Wingrove & Rogers C28-142	PC.20008/3	1	CRV.102
132	Glass 0·0039μF ±2% 300V d.c. Electrosil Limited	O/D PC.17807/1	1	
133	Radial min. met. mica 240pF ±2% 350V Lemco MS.611.	PC.18803/34	1	
134				
135	Radial min. met. mica 22pF ±1pF 350V Lemco MS.611	PC.18817/9	1	CR.1307
136	Electro. 15μF -20 +50% 315V d.c. Erie.	O/D PC.216567/3	1	
137	Electro. 10000μF +50 -10% Mullard 16V.	O/D PC.19412/16	1	
138	Electro. 2500μF +50 -10% 64V Mullard	O/D PC.19412/10	1	CR.9440
139	Double-ended 80μF +50 -10% 25V Mullard	O/D PC.19460/4	2	

MCL No.	Description	Standard Identity	Qty.	A/C. No.
	CAPACITORS cont.			
140	0.1μF ±20% 250V plastic.	O/D.PC.19669/77	2	
141	Electro. 64μF +50 -10% 64V Mullard C437AR/H64	O/D PC.19439/1	1	
142	Electro. 250μF +50 -10% 16V Mullard C437AR/E250.	O/D PC.19439/4	1	
143	Met.Film, 0·01μF ±10% 250V d.c.	PC.216473/1	1	CR.6110
144	Met. Insul. 0·01μF ±20% 250V Plastic.	O/D PC.19885/1 or O/D.PC.19893/1	4	CR.6198
145	Plysty 470pF ±2% 350V	PC.19502/21	1	
146	Plysty wire ended 27pF ±2pF 125V type PF	O/D PC.19540/41	0	CR.1323
147	Plysty. tub. ins. 330pF ±5% 125V d.c. GEC type PF	1/PC.19501/13	1	CR.3317
	RESISTORS fixed			
248	w.w. vit, enam, 15Ω ±5% 1½W	PC.67007/2	2	RF.2002
249	w.w. vit. enam. 4·7Ω ±5% 2½W Painton MVIA. C.G.S.	PC.67091/8	5	RF.8806
250	Metal oxide 5·6kΩ ±2% ½W type MR5 Welwyn Ltd. type TR5 Electrosil	PC.66641/97	1	RG.4493
251	Metal oxide 560Ω ±2% ½W type MR5 Welwyn Ltd. type TR5 Electrosil	PC.66641/24	1	RG.4468
252	Metal oxide 22Ω ±2% ½W type MR5 Welwyn Ltd. type TR5 Electrosil	PC.66641/14	4	RG.4433
253	Metal oxide 22Ω ±5% 6W Welwyn	O/D PC.66390/5	1	RF.9204
254	Metal oxide 10kΩ ±2% ¼W Electrosil TR4 Welwyn MR4	PC.66365/31	14	RA.3500
255	Metal oxide 100Ω ±2% ¼W Electrosil TR4 Welwyn MR4	PC.66365/8	9	RA.3450
256	Metal oxide 47kΩ ±2% ¼W Electrosil TR4 Welwyn MR4	PC.66365/38	2	RA.3516
257	Metal oxide 22kΩ ±2% ¼W Electrosil TR4 Welwyn MR4	PC.66365/35	8	RA.3508
258	Metal oxide 1kΩ ±2% ¼W Electrosil TR4 Welwyn MR4	PC.66365/21	7	RA.3475
259	Metal oxide 4·7kΩ ±2% ¼W Electrosil TR4 Welwyn MR4	PC.66365/28	5	RA.3491

R.50/4

MCL No.	Description	Standard Identity	Qty.	A/C. No.
	RESISTORS fixed			
260	Metal oxide 33Ω ±2% ½W Electrosil TR5 Welwyn MR5	PC.66641/16	6	RA.4437
261	Metal oxide 270Ω ±2% ¼W Electrosil TR5 Welwyn MR5	PC.66365/13	4	RA.3460
262	Metal oxide 4·7kΩ ±2% ½W Electrosil TR5	PC.66641/48	13	RA.4491
263	Metal oxide 1kΩ ±2% ½W Electrosil TR5	PC.66641/62	16	RA.4475
264	Metal oxide 330Ω ±2% ½W Electrosil TR5	PC.66641/84	9	RA.4462
265	Metal oxide 100Ω ±2% ½W Electrosil TR5	PC.66641/23	4	RA.4450
266	Metal oxide 470kΩ ±2% ½W Electrosil TR5	PC.66641/20	10	RA.4541
267	Metal oxide 68Ω ±2% ½W Electrosil TR5	PC.66641/131	1	RA.4446
268	Metal oxide 15Ω ±2% ½W Electrosil TR5	PC.66641/22	4	RA.4429
269	Metal oxide 27Ω ±2% ½W Electrosil TR5	PC.66641/15	2	RA.4435
270	Comp. 1MΩ ±10% ½W 350V d.c. Dubilier BET Morganite 'S'	PC.66609/55	5	RA.3150
271	Metal oxide 10Ω ±2% ½W Electrosil TR5	PC.66641/59	8	RA.4425
272	Metal oxide 390kΩ ±2% ½W Electrosil TR5	PC.66641/19	1	RA.4539
273	Metal oxide 220Ω ±2% ½W Electrosil TR5	PC.66641/57	8	RA.4458
274	Metal oxide 33kΩ ±2% ½W Electrosil TR5	PC.66641/76	13	RA.4512
275	Metal oxide 12kΩ ±2% ½W Electrosil TR5	PC.66641/85	10	RA.4502
276	Metal oxide 82Ω ±2% ½W Electrosil TR5	PC.66641/122	3	RA.4448
277	Metal oxide 390Ω ±2% ½W Electrosil TR5	PC.66641/63	6	RA.4464
278	Comp. 1·2MΩ ±10% ¼W 350V d.c. Morganite 'S'	PC.66609/56	1	RA.3152
279	Metal oxide 680Ω ±2% ½W Electrosil TR4	PC.66365/19	4	RA.3471

MCL No.	Description	Standard Identity	Qty.	A/C. No.
	RESISTORS cont.			
280	Metal oxide 33Ω ±2% ¼W Electrosil TR4	PC.66365/81	2	RA.3437
281	Metal oxide 22Ω ±2% ¼W Electrosil TR4	PC.66365/62	3	RA.3433
282	Comp. 2·2MΩ ±10% ½W 350V d.c. Morganite 'S' Dubilier BTT	PC.66609/59	5	RA.3158
283	Metal oxide 10Ω ±2% ¼W Electrosil TR4	PC.66365/80	1	RA.3425
284	Metal oxide 33Ω ±5% ¼W Electrosil TR4	O/D PC.66510/3	1	RA.3437
285	Metal oxide 22kΩ ±2% ½W Electrosil TR5	PC.66641/75	16	RA.4508
286	Metal oxide 2·2kΩ ±2% ½W Electrosil TR5	PC.66641/80	30	RA.4483
287	Metal oxide 1·2kΩ ±2% ½W Electrosil TR5	PC.66641/79	8	RA.4477
288				
289	Metal oxide 150kΩ ±2% ½W	PC.66641/149	2	RA.4529
290	Metal oxide 100kΩ ±2% ½W Electrosil TR5	PC.66641/67	8	RA.4525
291	Metal oxide 470Ω ±2% ¼W Electrosil TR4	PC.66365/16	7	RA.3466
292				
293	Metal oxide 180Ω ±2% ¼W Electrosil TR4	PC.66365/11	1	RA.3456
294				
295	Metal oxide 15kΩ ±2% ½W Electrosil TR5	PC.66641/53	7	RA.4504
296	Metal oxide 3·3kΩ ±2% ½W Electrosil TR5	PC.66641/50	18	RA.4487
297	Comp. 10Ω ±10% ¼W 350V d.c. Morganite 'S'	PC.66609/68	5	RA.3025
298	Metal oxide 47Ω ±5% ¼W 250V d.c. Electrosil TR4	O/D PC.66510/5	1	RA.3441
299	Metal oxide 270kΩ ±5% ¼W 250V d.c. Electrosil TR4	O/D PC.66510/54	3	
300	Metal oxide 22Ω ±5% ¼W 250V d.c. Electrosil TR4	O/D PC.66510/1	5	RA.3433

MCL NO.	Description	Standard Identity	Qty.	A/C. No.
	RESISTORS fixed cont.			
301	Metal oxide 39Ω ±5% ¼W 250V d.c. Electrosil TR4	C/D PC.66510/4	3	RA.3439
302				
303	Metal oxide 270Ω ±2% ½W Electrosil TR5	PC.66641/55	1	RA.4460
304	Metal oxide 2·2kΩ ±2% ¼W Electrosil TR4	PC.66365/24	19	RA.3483
305	Metal oxide 3·3kΩ ±2% ¼W Electrosil TR4	PC.66365/26	1	RA.3487
306	Metal oxide 150Ω ±2% ¼W Electrosil TR4	PC.66365/10	2	RA.3454
307	Metal oxide 1·5kΩ ±2% ¼W Electrosil TR4	PC.66365/22	5	RA.3479
308				
309	Metal oxide 220Ω ±2% ¼W Electrosil TR4	PC.66365/12	7	RA.3458
310	Metal oxide 2·7kΩ ±2% ¼W Electrosil TR4	PC.66365/25	1	RA.3485
311	Metal oxide 680Ω ±2% ½W Electrosil TR5	PC.66641/65	6	RA.4471
312	Metal oxide 100kΩ ±2% ¼W Electrosil TR4	PC.66365/42	5	RA.3525
313	Metal oxide 8·2kΩ ±2% ½W Electrosil TR5	PC.66641/82	7	RA.4498
314	Metal oxide 3·9kΩ ±2% ½W Electrosil TR5	PC.66641/83	6	RA.4489
315	Metal oxide 1·8kΩ ±2% ½W Electrosil TR5	PC.66641/58	11	RA.4481
316				
317	Metal oxide 10kΩ ±2% ½W Electrosil TR5	PC.66641/47	64	RA.4500
318				
319	Metal oxide 150Ω ±2% ½W Electrosil TR5	PC.66641/52	2	RA.4454
320	Metal oxide 56Ω ±2% ½W Electrosil TR5	PC.66641/1	1	RA.4443
321	Metal oxide 1·5kΩ ±2% ½W Electrosil TR5	PC.66641/56	5	RA.4479

MCL No.	Description	Standard Identity	Qty.	A/C. No.
	RESISTORS fixed cont.			
322	Metal oxide 68kΩ ±2% ½W Electrosil TR5	PC.66641/77	5	RA.4521
323				
324	39Ω ±2% ½W Metal oxide Electrosil TR5	PC.66641/17	1	RA.4439
325	Metal oxide 47Ω ±2% ½W Electrosil TR5	PC.66641/18	4	RA.4441
326	Metal oxide 220kΩ ±2% ½W Electrosil TR5	PC.66641/12	2	RA.4533
327	Metal oxide 6·8kΩ ±2% ¼W Electrosil TR4	PC.66365/29	4	RA.3496
328				
329	Metal oxide 270kΩ ±2% ½W Electrosil TR5	PC.66641/13	2	RA.4535
330				
331	Metal oxide 470Ω ±2% ½W Electrosil TR5	PC.66641/64	8	RA.4466
332	Metal oxide 2·7kΩ ±2% ½W Electrosil TR5	PC.66641/51	6	RA.4485
333	Metal oxide 33kΩ ±2% ¼W Electrosil TR4	PC.66365/36	1	RA.3512
334	Metal oxide 5·6kΩ ±2% ¼W Electrosil TR4	PC.66365/2	2	RA.3493
335	Metal oxide 560Ω ±2% ¼W Electrosil TR4	PC.66365/17	7	RA.3468
336	Metal oxide 6·8kΩ ±2% ½W Electrosil TR5 Welwyn MR5	PC.66641/98	5	RA.4496
337	Metal oxide 39kΩ ±2% ½W Electrosil TR5 Welwyn MR5	PC.66641/104	6	RA.4514
338	Metal oxide 47kΩ ±2% ½W Electrosil TR5 Welwyn MR5	PC.66641/81	3	RA.4516
339	Metal oxide 27kΩ ±2% ½W Electrosil TR5 Welwyn MR5	PC.66641/46	1	RA.4510
340	Metal oxide 18kΩ ±2% ¼W Electrosil TR4 Welwyn MR4	PC.66365/34	1	RA.3506
341	Vitreous enamelled w.w. 12 ±5% 2½W Welwyn W21 Painton MVIA CCS	PC.67091/2	1	RF.8802

MCL No.	Description	Standard Identity	Qty.	A/C. No.
	RESISTORS fixed cont.			
342	Metal oxide 820Ω ±2% ½W Electrosil TR5 Welwyn MR5	PC.66641/95	4	RA.4473
343	Vitreous enamelled 2·2Ω ±5% 2½W Welwyn W21 Painton MVLA CGS	PC.67091/5	1	RF.8804
344	220Ω ±5% 1½W w.w. Painton RMV3-5	PC.67007/9	1	RF.2033
345	390Ω ±2% ¼W Electrosil TR4 Welwyn MR4	PC.66365/15	4	RA.3464
346	8·2kΩ ±2% ¼W Electrosil TR4 Welwyn MR4	PC.66365/30	6	RA.3498
347	330Ω ±2% ¼W Electrosil TR4 Welwyn MR4	PC.66365/14	1	RA.3462
348				
349	1·8kΩ ±2% ¼W Electrosil TR4 Welwyn MR4	PC.66365/23	3	RA.3481
350	82Ω ±2% ¼W Electrosil TR4 Welwyn MR4	PC.66365/7	8	RA.3448
351	3·9kΩ ±2% ¼W Electrosil TR4 Welwyn MR4	PC.66365/27	4	RA.3489
352	Metal oxide 12kΩ ±2% ¼W Electrosil TR4	PC.66365/32	1	RA.3502
353	1·2kΩ ±2% ¼W Electrosil TR4 Welwyn Electric MR4	PC.66365/1	3	RA.3477
354	68Ω ±2% ¼W Electrosil TR4 Welwyn Electric MR4	PC.66365/6	3	RA.3446
355				
356	15Ω ±2% ¼W Electrosil TR4 Welwyn MR4	PC.66365/67	1	RA.3429
357	15kΩ ±2% ¼W Electrosil TR4 Welwyn MR4	PC.66365/33	2	RA.3504
358	330kΩ ±10% ¼W 350V d.c. Morganite 'S' Dubilier BTT	PC.66609/49	1	RA.3137
359	82kΩ ±2% ¼W Electrosil TR4 Welwyn MR4	PC.66365/41	1	RA.3523
360	820Ω ±2% ¼W Electrosil TR4 Welwyn MR4	PC.66365/20	1	RA.3473
361	330kΩ ±2% ½W Electrosil MR5	PC.66641/161	1	RA.4537

MCL No,	Description	Standard Identity	Qty.	A/C. No.
	RESISTORS fixed cont.			
362	Metal oxide 18kΩ ±2% ½W Electrosil TR5 Welwyn MR5	PC.66641/60	1	RA.4506
363				
364				
365				
366				
367				
368				
369	10Ω ±5% 1½W w.w. Painton MVIA Welwyn W.21	PC.67007/1	1	RF.2001
370	68Ω ±5% 1½W w.w. Painton MVIA Welwyn W.21	PC.67007/6	1	RF.2005
371	1Ω ±5% 3W w.w. Painton 30GA Welwyn W.22	PC.67008/21	1	RF.2121
372	2·2Ω ±1% 3W w.w. Painton 30GA Welwyn W.22	PC67008/25	1	RF.2125
373	4·7MΩ ±10% ½W 350V d.c. Dubilier BTT Morganite 'S'	PC.66609/63	1	RE.3158
374	Metal oxide 15Ω ± 10% ½W Electrosil TR5 Welwyn MR5	PC.66609/70	1	RE.3029
	RESISTORS VARIABLE			
450	Comp. single section 'ES' inv. Log. 5kΩ ±20% 1W Plessey 404/8/02100 1in. spindle.	O/D PC.67361/1	1	RV.1902
451	Comp. 'E' 100kΩ Lin. ±10% 500V Plessey 13/16in. spindle.	O/D PC.67246/55	1	RV.3620
452	Comp. 'E' 25kΩ Lin. ±10% 500V Plessey 02001/397 13/16 in. spindle.	O/D PC.67246/54	1	RV.3619
453	Comp. 'E' 5kΩ Lin. ±10% 2W 500V Plessey 02001/398 13/16 in. spindle.	O/D PC.67246/53	1	RV.3618
454	Comp. 'E' 10kΩ log. ±20% 1W 500V Plessey 13/16in. spindle. 02001/399.	O/D PC.67243/57	1	RV.3808
455	100Ω ±20% 0·2W Morganite 62H	O/D PC.67355/3	2	RV.4402
456	22kΩ ±20% 0·2W Morganite 62H	O/D PC.67355/7	1	RV.4405

MCL No.	Description	Standard Identity	Qty.	A/C. No.
	RESISTORS VARIABLE			
457	1kΩ ±20% 0·2W Morganite 62H	O/D PC.67355/5	3	RV.4403
458	10kΩ ±20% 0·2W Morganite 62H	O/D PC.67355/2	2	RV.4406
459	220Ω ±20% 0·2W 350V d.c. Morganite 81E.	O/D PC.67356/5	2	RV.7601
460	50Ω ±20% 200V d.c. ½W Morganite 62V.	O/D PC.67369/3	4	RV.7701
461	100Ω ±20% 0·2W 350V d.c. Morganite 62V.	O/D PC.67356/4	1	RV.7602
462	10kΩ ±20% 0·2W 350V d.c. Morganite	O/D PC.67356/2	4	RV.7603
463	470Ω ±20% 350V d.c. 0.2W Morganite 62H.	O/D PC.67355/8	1	RV.4407
464	100kΩ ±20% 350V d.c. 0.2W Morganite 62H	O/D PC.67355/4	2	RV.4408
465	4·7kΩ ±20% 350V d.c. 0.2W Morganite 62H	O/D PC.67355/6	1	RV.4409
466	22kΩ ±20% 350V d.c. ¼W Plessey MPD.	O/D PC.67332/10	1	RV.7507
467	2·2kΩ ±20% 350V d.c. ¼W Plessey MPD.	O/D PC.67332/3	1	RV.7502
468	220Ω ±20% 350V d.c. ¼W. Plessey MPD.	O/D PC.67332/9	1	RV.7508
	INDUCTORS			
500	Dubilier 666 6μH 1A.	WIS.6224/C Ref.1	22	CK.93
501	10μH r.f.choke. Painton 58/10/0011/10.	O/D PC.473014/11	2	IDF.704
502	R.F. Moulded Tubular Cambion Electric 3711-2.2 220μH.	O/D PC.473059/2	1	
503	Sub-miniature R.F. Painton 58/10/0012/10 15μH.	O/D PC.473014/12	1	
504	Sub-miniature R.F. Painton 100μH 58/10/0017/10	O/D PC.473014/17	13	IDF.695
505		N-42-1035-01	1	
506		N-42-1036-01	1	
507		N-42-1037-01	1	
508		N-42-1038-01	1	
509		N-42-1039-01	2	RDF.689
510		N-42-1040-01	1	

MCL No.	Description	Standard Identity	Qty	A/C. No.
	INDUCTORS cont.			
511		N-42-1086-01	1	
512		N-42-1087-01	1	
513		N-42-1089-01	1	
514		N-42-1090-01	1	
515		N-42-1041-01	1	
516		N-42-1042-01	1	
517		N-42-1043-01	1	
518		N-42-1044-01	1	
519		N-42-1045-01	1	
520		N-42-1046-01	1	
521		N-42-1091-01	1	
522		N-42-1092-01	1	
523		N-42-1094-01	1	
524		N-42-1095-01	1	
525		N-42-1047-01	1	
526		N-42-1048-01	1	
527		N-42-1049-01	1	
528		N-42-1050-01	1	
529		N-42-1051-01	1	
530		N-42-1052-01	1	
531		N-42-1096-01	1	
532		N-42-1097-01	1	
533		N-42-1099-01	1	
534		N-42-1100-01	1	
535		N-42-1053-01	7	IDF.729
536		N-42-1054-01	1	IDF.730
537		N-42-1055-01	1	IDF.731
538		N-42-1056-01	1	IDF.732
539		N-42-1057-01	1	IDF.733
540		N-42-1101-01	1	IDF.734

MCL No.	Description	Standard Identity	Qty.	A/C. No.
	INDUCTORS cont.			
541		N-42-1102-01	1	IDF.735
542		N-42-1103-01	1	IDF.736
543		N-42-1105-01	1	IDF.737
544		N-42-1106-01	1	IDF.738
545		N-42-2731-01	1	IDF.739
546		N-42-2732-01	1	IDF.740
547				
548		N-42-1134-01	1	IDF.692
549		N-42-1135-01	1	IDF.693
550		N-42-1117-01	1	IDF.696
551		N-42-1118-01	1	IDF.697
552		N-42-1119-01	1	IDF.698
553		N-42-1120-01	1	IDF.699
554		N-42-1121-01	1	IDF.700
555		N-42-1122-01	1	IDF.701
556		N-42-1123-01	1	IDF.702
557	Painton 1µH ±10% 1/3 - 1/5W 58/10/0023/10.	O/D PC.473014/23	2	IDF.694
558	Painton 47µH ±10% 1/3 - 1/5 W, 58/10/0015/10.	O/D PC.473014/15	2	IDF.710
559	80µH	N-42-2609-01	4	IDF.709
560	6.8µH Painton 58/10/0010/10	O/D.PC.473014/10	-	IDF.703
561	0.68µH Painton 58/10/0004/10	O/D.PC.473014/4	1	
562	Painton 22µH ±10% 1/3 - 1/5W 58/10/0013/10.	O/D PC.473014/13	11	IDF.691
563		N-42-1153-01	3	IDF.711
564		N-42-1154-01	3	IDF.712
565		N-42-1155-01	3	IDF.713
566		N-42-1150-01	3	IDF.714
567		N-42-1151-01	3	IDF.715
568		N-42-1152-01	3	IDF.716
569		N-42-1156-01	3	IDF.717

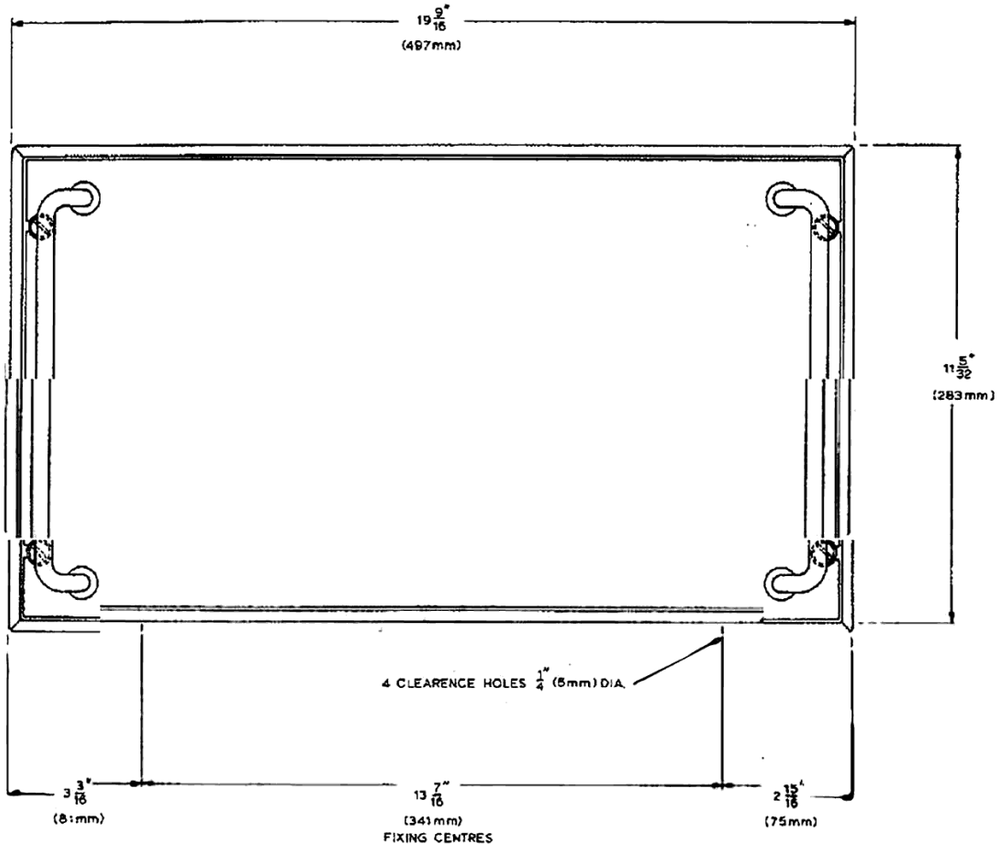
MCL No,	Description	Standard Identity	Qty.	A/C. No.
	INDUCTORS cont.			
570		N-42-2609-01	-	
571	Painton ±10% 1/3 - 1/5W 58/10/0019/10 220µH	0/D PC.473014/19	1	IDF.718
572		N-42-1225-01	1	IDF.719
573		N-42-2521-01	2	IDF.721
574		N-42-2522-01	2	IDF.722
575		N-42-1166-01	2	IDF.723
576		N-42-2520-01	2	IDF.720
577		N-42-2517-01	2	IDF.724
578		N-42-2519-01	2	IDF.726
579		N-42-1168-01	2	IDF.728
580		N-42-2518-01	2	IDF.725
581		N-42-1167-01	2	IDF.727
582	Painton Part No.58/10/0110/05 5·6µH	0/D PC.473047/3	2	IDF.705
583	Painton Part No.58/10/0009/05 4·7µH	0/D PC.473047/2	1	IDF.708
584	Steatite Insulations Ltd. 14µH 87/5708/04.	0/D PC.473046/1	1	IDF.706
585	2·7µH	N-42-1793-01	1	IDF.707
586	Dubilier 668C 6µH 3A.	WIS.6224/C Ref.3A	1	CK.196
	DIODES			
650	BYX10	PS.100181	1	CRX.346
651	1N914 (Alt. 1N916 PS.100866)	PS.100865	175	CRX.199
652	1N916	PS.100866	2	CRX.284
653	BA182		1	CRX.510
654	HS7068 6·8V Zener		1	CRX.254
655	HS7120 12V Zener		1	CRX.111
656	4/OA9CB Matched Quad Alt. MDG.25.		3	CRX.502
657	OA95	PS.100447	6	CRX.47
658	OA202		5	CRX.32
R.50/4 659	BZY88-C5V6 400mW		2	CRX.255

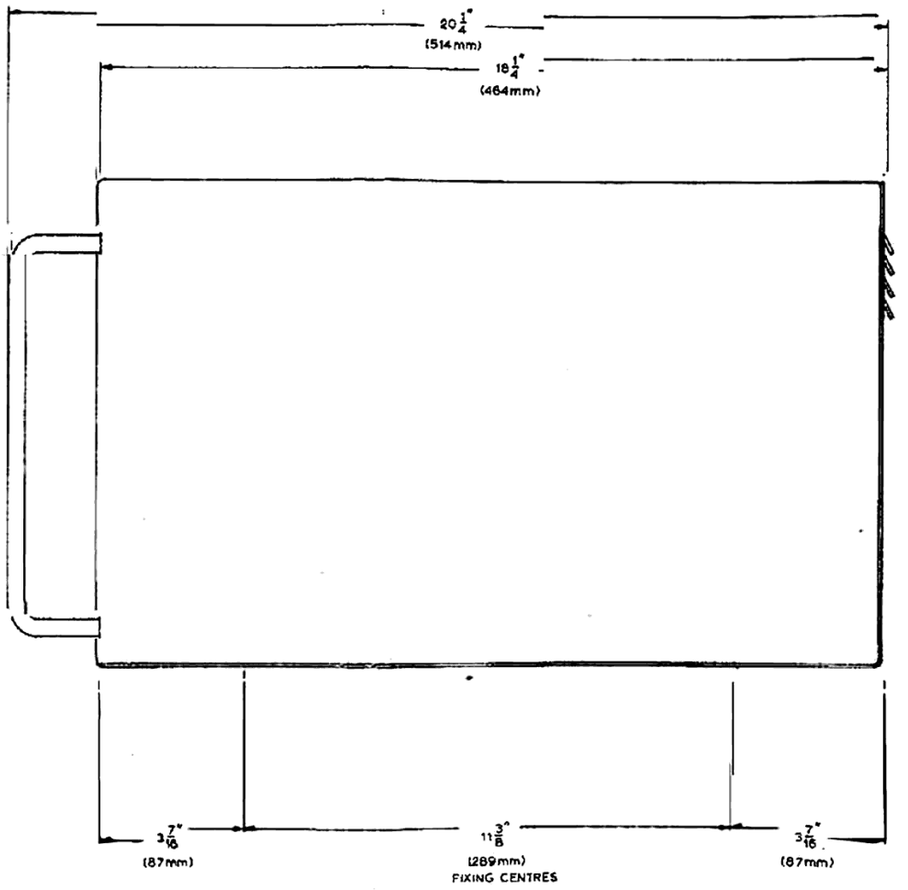
MCL No.	Description	Standard Identity	Qty.	A/C. No.
	DIODES cont.			
660	BZX46-C12		1	CRX.505
661	OAZ222 5·6V 1CW		2	CRX.513
662	BA111		3	CRX.491
663	BZY88 - C9V1		2	CRX. 49
664	HS 2027		1	
665	BZY88-C10		1	CRX.365
666	BZY88-C12		1	CRX.358
667	BYX22/800		1	CRX.292
668	BYX38/300		7	CRX.507
669	BYX22/400		1	CRX.177
670	BZY88-C6V2		1	CRX.359
671				
672				
	TRANSISTORS			
700	UC734B		5	TRS.401
701	BF115		31	TRS.154
702	UC734 Red spot UC734 Green spot }	Matched Pair PS.202401	1	TRS.403
703	40673		1	TRS.402
704	2N2369A		26	TRS.330
705	2N3053	PS.101209	21	TRS.100
706				
707	BCY31		2	TRS.117
708	MPS6534		1	TRS.382
709	2N4921		1	TRS.400
710	2N4918		1	TRS.333
711	BC109		1	TRS.273
712	C400		3	TRS.236
713	BCY30		3	TRS.162
714	2N3055		3	TRS.140

MCL No.	Description	Standard Identity	Qty.	A/C. No.
	TRANSISTORS cont.			
715				
716	CA07 or S.G.S. BC394		56	TRS.371 TRS.460
717				
718	2N709		4	TRS.412
	INTEGRATED CIRCUITS			
750	S.G.S. type T101D1		5	IC. 25
751	S.G.S. type U6A-9094-59X		2	IC. 23
752	CA3028A		4	IC. 24
753	S.G.S. T101D1, selected for 40MHz and marked with white spot. (For Edition 01 version of Board 12F).		5	IC. 34
OR				
753A	S.G.S. T101D1, selected for 32MHz and marked 'selected 02'. (For Edition 02 version of Board 12F).		5	IC. 73
754	S.G.S. U6A-9945-59X.		47	IC. 26
755	S.G.S. U6A-9962-59X		1	IC. 27
756	S.G.S. T102D1 selected for 40MHz and marked with white spot.		1	IC. 28
757	S.G.S. U6A-9946-59X.		2	IC. 29
758	Plessey SL640C		1	IC. 16
759	Texas SN74500/N		1	IC. 46
	FUSES			
780	Beswick M Belling Lee 562 2·5A	WIS.3981/C Ref.7	2	FUZ.79
781	Beswick TDC134 50mA	WIS.10604/C Ref.6	1	FUZ.259
782	(210-260V mains) 0·5A	WIS.10604/C Ref.4	2	FUZ.261
783	(105-130V mains) 1A	WIS.10604/C Ref.2	2	FUZ.260
784	0·5A	WIS.3981/C Ref.5	1	FUZ.77
785	4A	WIS.3981/C Ref.9	1	FUZ.80
	INDICATORS			
800	Numerical indicator tube STC type GNP - 7A		6	VIG.18

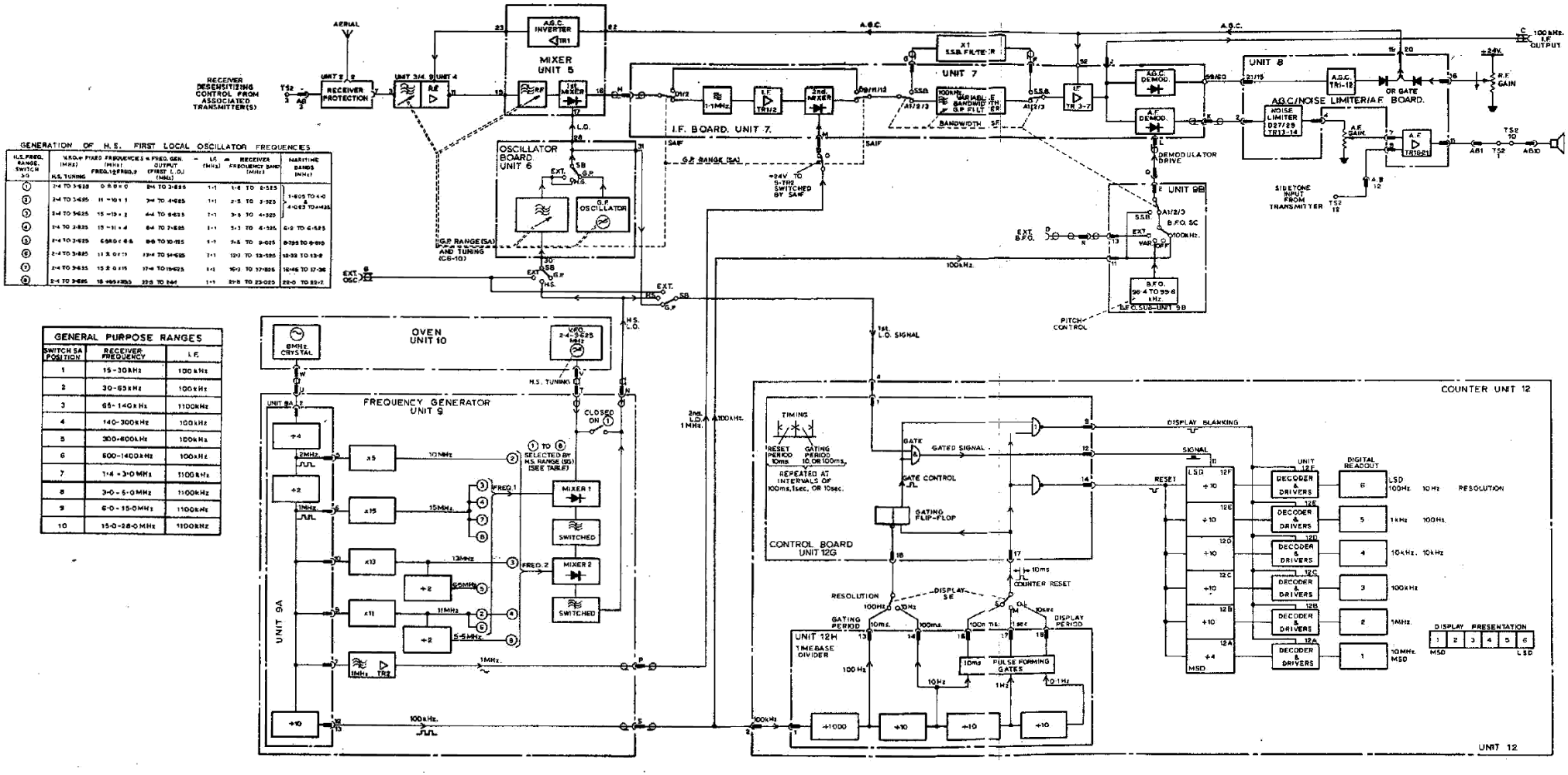
MCL No.	Description	Standard Identity	Qty.	A/C. No.
LAMPS				
810	Red lens and bulb assy. c/w holder L.1897A.	O/D PC.48025/1	1	HDL.140
811	14V 0·75W bulb Philips or Vitality Type 582 BES E5/8	PC.48708/13	1	LAL.62
812	6·5V 1W bulb Philips or Vitality type 674 BES E5/8	PC.48708/8	1	LAL.37
	PLUGS			
840	Belling Lee L1465/FP	WIS.11019/B Ref.2	16	PLF.31
841	18 way Painton 310610	PC.57038/1	1	PLC.43
842	12 way Painton 311747	PC.57030/1	1	PLC.69
843	Faston, single pole.	W.97844/1	12	
	SOCKETS			
880	Belling Lee L603/BLACK	WIS.10739/B Ref.2	3	SOF.39
881	Painton 310591. 12 way	PC.57035/1	1	SOC.83
882	Printed wiring 16-pole 880 series Ultra 6S 55670 ZA8 16J.	WIS.10035/15	1	
883	Printed wiring 24-pole Ultra 6S 55670 ZA 24P.	WIS.10035/78	2	
884	Printed wiring 16-pole Ultra 6S 55670 ZA.16J	O/D PC.59003/2	1	SOG.180
885	18 way. Painton 311790	PC.57039/1		SOC. 45
886	14-pole Ultra S170 series CS 504-1	O/D PC.59017/1	1	SOG.181
887	14-pole Ultra S170 series CS 504-2.	O/D PC.59017/2	1	SOG.182
888	32-pole Ultra S170 series CS 505.	O/D PC.59098/1	1	SOG.183
889	Printed wiring 18-pole single sided 0·1 pitch 1/16in. board. Ultra CS503-1	O/D PC.59016/1	1	SOG.173
890	Printed wiring 18-pole single sided 0·1 pitch 1/16 in. board. Ultra 5170 series CS 503-2.	O/D PC.59016/2	4	SOG.174
891	Printed wiring 18-pole single sided 0·1 pitch 1/16in. board Ultra 5170 series, CS 503-3.	O/D PC.59016/3	1	SOG.175

MCL No.	Description	Standard Identity.	Qty.	A/C.No.
	SOCKETS cont.			
892	Printed wiring 18-pole single sided 0·1 pitch 1/16in. board Ultra. CS503-4	O/D.PC.59016/4	1	SOG.176
893	Printed wiring 18-pole single sided 0·1 pitch 1/16in. board Ultra. CS503-5	O/D.PC.59016/5	1	SOG.177
894	Audio D.C. & L.F. 2-pole type J421C Rendar Inst.	O/D.PC.59044/3	1	JAK. 19
895	Audio D.C. & L.F. 2-pole type J421B Rendar Inst.	O/D.PC.59044/2	1	JAK. 40
896	Co-ax. connectors 2V d.c.Belling Lee L1465CS.	WIS.11019/B	14	SOF. 46
897	Co-ax. socket 75Ω B.N.C.	PC.60038/1	1	
898	Socket, vertical mounted.	O/D.PC.56788/1	4	
899	Faston socket	WIS.9764/2	28	
	SWITCHES.			
950	Rotary wafer non-sealed standard mech. type F dia.H.	O/D.PC.72024/1	1	SWI.188
951	Rotary wafer non-sealed standard mech. type F dia.H.	O/D.PC.72024/2	1	SWI.189
952	Rotary wafer non-sealed standard mech. type F dia.H.	O/D.PC.72024/4	1	SWI.190
953	N.S.F. SD (HD)	WIS.11953/B Sh.20	1	
954	AB 700 series	WIS.11338 Sh.10	1	
955	Dia. H, Oak Rotary type MF	O/D.PC.73794/8	1	
956	Dia. H, Oak Rotary type MF	O/D.PC.73794/7	1	
957	Dia. H, Oak Rotary type MF	O/D.PC.73794/9	1	
958	Dia. H, Oak Rotary type MF	O/D.PC.73794/1	1	
959	Dia. H, Oak Rotary type MF	O/D.PC.73794/2	1	
960	Dia.H, Controls Ltd type F (wafer only)	O/D.PC.73789/1	1	
961	Switch card	M32-1715-09		SWD.150
	wafer only	WIS.11467/C Sh.9	1	
962	Switch card	M32-1715-10		SWD.151
	wafer only	WIS.11467/C Sh.10	1	
963	Switch card	M32-1715-11		SWD.152
	wafer only	WIS.11467/C Sh.11	1	
964	Switch card	M32-1715-12		SWD.153
	wafer only	WIS.11467/C Sh.12	1	
965	Switch card	M32-1715-13		SWD.154
	wafer only	WIS.11467/C Sh.13	1	
966	Switch card	M32-1715-14		SWD.155
	wafer only	WIS.11467 Sh.14	1	





APOLLO RECEIVER
OUTLINE



GENERATION OF H.S. FIRST LOCAL OSCILLATOR FREQUENCIES

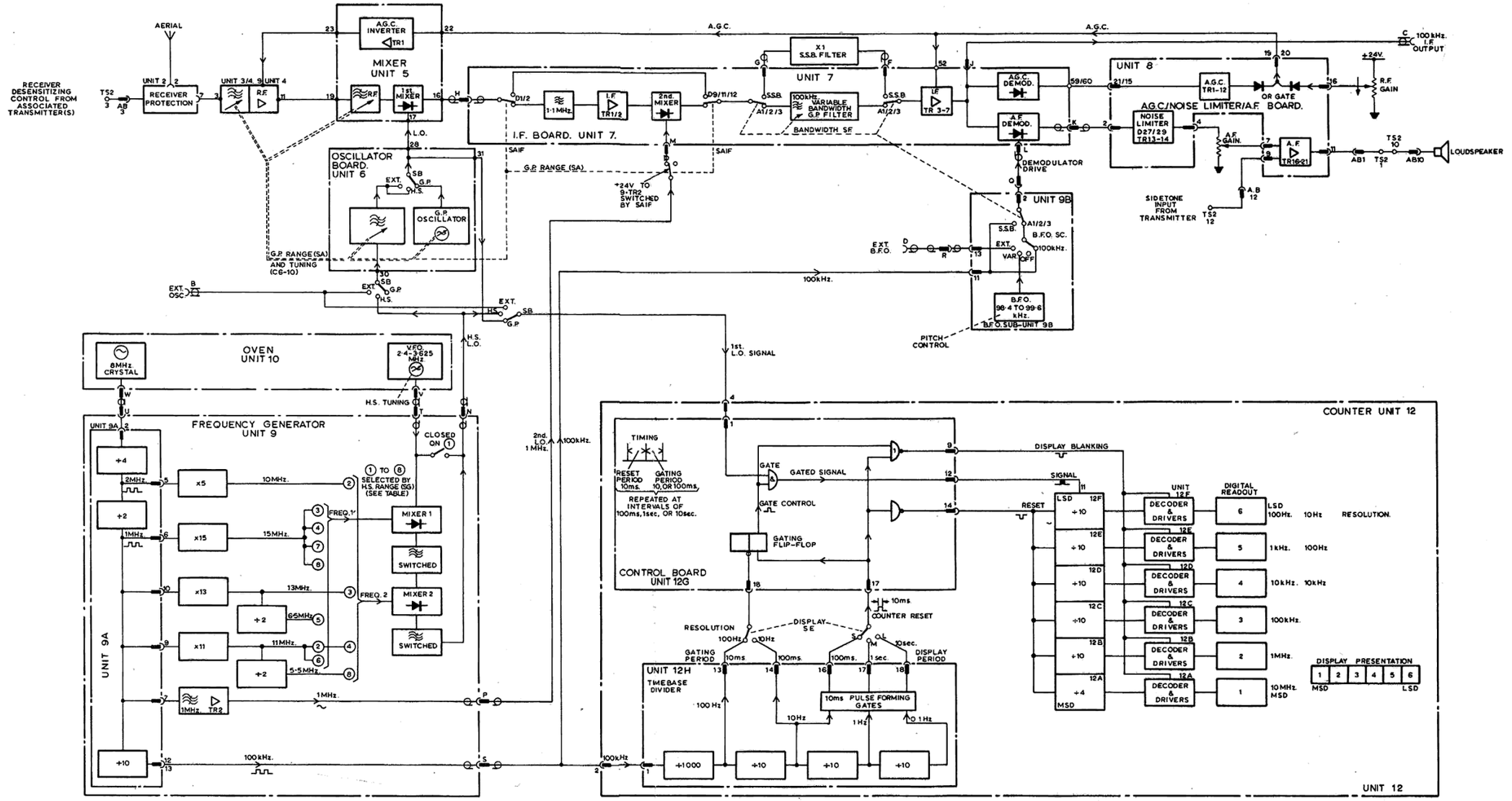
H.S. FREQ. RANGE. SWITCH S10	H.S.O/P FREQ (MHz) H.S. TUNING	FIXED FREQUENCIES & FREQ. GEN. OUTPUT (FIRST L.O.) FREQ.1 / FREQ.2 (MHz)	— H.S. = (MHz)	RECEIVER FREQUENCY BAND (MHz)	MARITIME BANDS (MHz)
1	2·4 TO 3·928	0·8 0·6 0	2·4 TO 3·925	1:1	1·6 TO 2·525
2	2·4 TO 3·625	11 ÷10 x 1	3·4 TO 4·625	1:1	2·5 TO 3·525
3	2·4 TO 3·625	15 ÷15 x 2	4·4 TO 6·625	1:1	3·5 TO 4·525	1·605 TO 4·0 & 4·063 TO 4·438
4	2·4 TO 3·825	15 ÷11 x 4	6·4 TO 7·625	1:1	5·3 TO 6·525	6·2 TO 6·525
5	2·4 TO 3·625	6·8 0 x 6·6	8·6 TO 10·825	1:1	7·5 TO 9·025	8·795 TO 8·895
6	2·4 TO 3·825	13 2 0 x 13	13·4 TO 14·625	1:1	10·3 TO 13·525	12·32 TO 13·0
7	2·4 TO 3·625	15 2 0 x 15	17·4 TO 19·625	1:1	14·3 TO 17·525	16·46 TO 17·36
8	2·4 TO 3·625	18 19·0 x 20·5	23·5 TO 24·1	1:1	21·5 TO 23·025	22·0 TO 22·7

GENERAL PURPOSE RANGES

SWITCH SA POSITION	RECEIVER FREQUENCY	I.F.
1	15-30kHz	100kHz
2	30-65kHz	100kHz
3	65-140kHz	1100kHz
4	140-300kHz	100kHz
5	300-600kHz	100kHz
6	600-1400kHz	100kHz
7	1·4 - 3·0 MHz	1100kHz
8	3·0 - 6·0 MHz	1100kHz
9	6·0 - 15·0 MHz	1100kHz
10	15·0-28·0 MHz	1100kHz

N/S.5758/D SH.1
ISSUE 1

APOLLO RECEIVER
BLOCK SCHEMATIC DIAGRAM



GENERATION OF H.S. FIRST LOCAL OSCILLATOR FREQUENCIES

H.S. FREQ. RANGE. SWITCH SG	V.F.O.+ FIXED FREQUENCIES (MHz) = FREQ. GEN. OUTPUT (FIRST L.O.) (MHz)			− I.F. (MHz)	= RECEIVER FREQUENCY BAND (MHz)	MARITIME BANDS (MHz)
	H.S. TUNING	FREQ.1±FREQ.2				
①	2·4 TO 3·625	0 ± 0 = 0	2·4 TO 3·625	1·1	1·6 TO 2·525	1·605 TO 4·0 & 4·063 TO 4·438
②	2·4 TO 3·625	11 ÷10 = 1	3·4 TO 4·625	1·1	2·5 TO 3·525	
③	2·4 TO 3·625	15 −13 = 2	4·4 TO 5·625	1·1	3·5 TO 4·525	
④	2·4 TO 3·625	15 −11 = 4	6·4 TO 7·625	1·1	5·3 TO 6·525	6·2 TO 6·525
⑤	2·4 TO 3·625	6·5±0 = 6·5	8·9 TO 10·125	1·1	7·8 TO 9·025	8·795 TO 8·815
⑥	2·4 TO 3·625	11 ± 0 = 11	13·4 TO 14·625	1·1	12·3 TO 13·525	12·33 TO 13·2
⑦	2·4 TO 3·625	15 ± 0 = 15	17·4 TO 18·625	1·1	16·3 TO 17·525	16·46 TO 17·36
⑧	2·4 TO 3·625	15 +5·5 = 20·5	22·9 TO 24·1	1·1	21·8 TO 23·025	22·0 TO 22·7

GENERAL PURPOSE RANGES		
SWITCH SA POSITION	RECEIVER FREQUENCY	I.F.
1	1·5-3·0kHz	100 kHz
2	3·0-6·5kHz	100kHz
3	6·5-14·0kHz	1100kHz
4	14·0-30·0kHz	100kHz
5	30·0-60·0kHz	100kHz
6	60·0-140·0kHz	100kHz
7	1·4-3·0 MHz	1100kHz
8	3·0-6·0MHz	1100kHz
9	6·0-13·0MHz	1100kHz
10	13·0-28·0MHz	1100kHz

'APOLLO' RECEIVER N-01-2050-01

BLOCK SCHEMATIC DIAGRAM

N/S 6758/D

Cross Reference List
for
Apollo Receiver

Main Chassis
Circuit Diagram (Unit 1)

Ref.	M.C.L. No.
C1	1
C2	1
C3	1
C4	2
C5	2
C6)	3
C7)	
C8)	
C9)	4
C10)	
C11	5
C12	5
C13	6
C14	7
C16	8
C17	8
C18	7
C19	9
C21	9
C22	7
C23	8
C24	6
C27	7
C28	7
C29	7
C30	7
C31	7
C32	7
R1	248
R2	248
R3	249
R4	249
R5	249
R6	249
R7	250
R8	251
R9	347
RV1	450
RV2	451
RV3	452
RV4	453
RV5	454

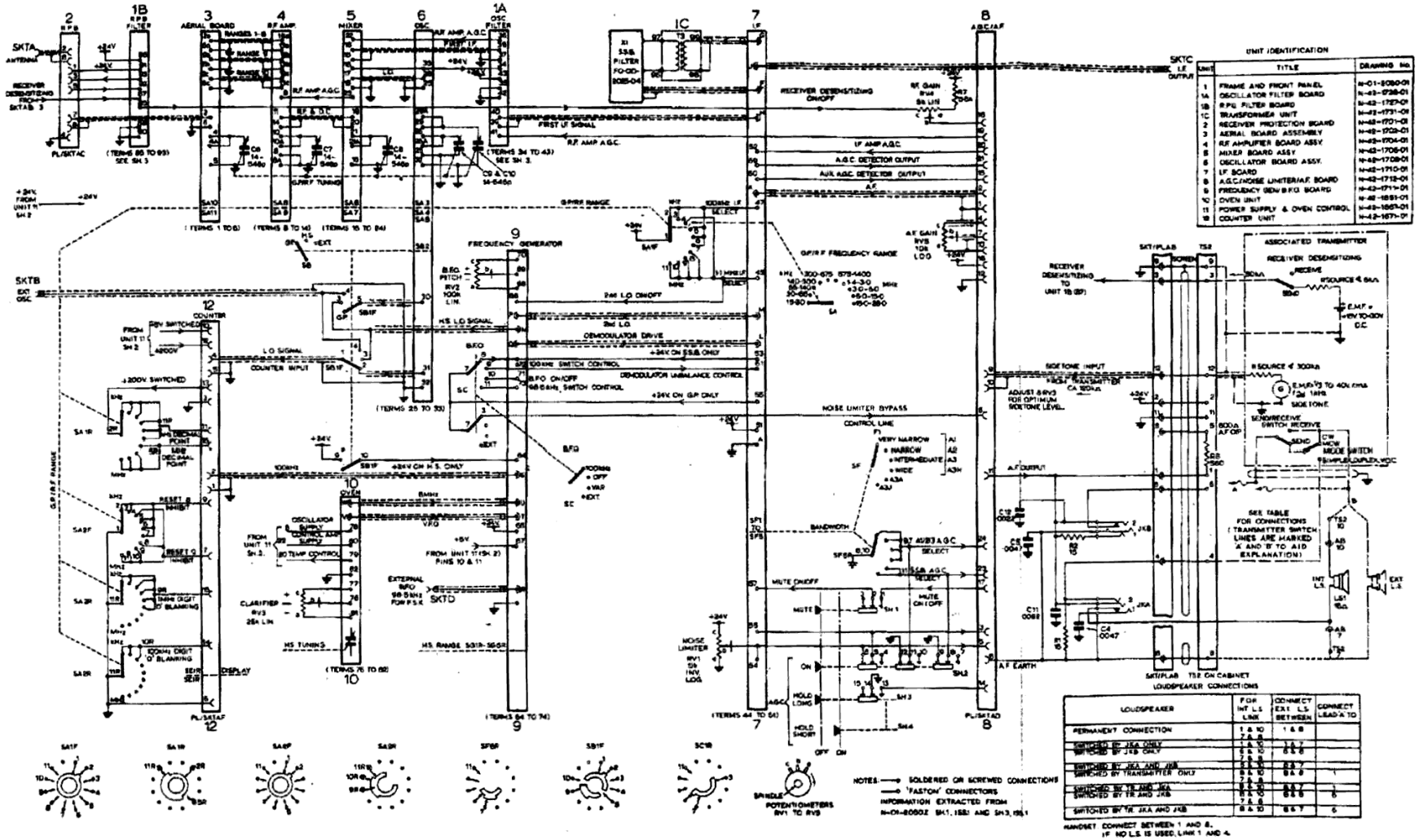
Ref.	M.C.L. No.
L1	500
L2	500
L4	501
L6	500
L7	500
L8	500
L9	502
L11	503
L12	501
L15	504
L16	504
L17	504
L18	504
L19	504
L20	504
FS1	780
FS2	781
FS3	780
FS4	782 (for 210-260V)
	783 (for 105-130V)
FS5	782 (for 210-260V)
	783 (for 105-130V)
FS6	784
FS7	785
PLF	840
PLG	840
PLH	840
PLJ	840
PLK	840
PLL	840
PLM	840
PLN	840
PLP	840
PLQ	840
PLR	840
PLS	840
PLT	840

Ref.	M.C.L. No.
PLU	840
PLV	840
PLW	840
PLA	841
PLAB	842
SKTA	897
SKTB	880
SKTC	880
SKTD	880
SKTAB	881
SKTAC	882
SKTAD	883
SKTAE	883
SKTAF	884
SA 1&2	950
SB1	951
SC1	952
SD 1&2	953
SF 6	976
SH 1-4	954
T1	1054
T2	1055
T3	1055
ILP1	810
ILP2	811
ILP3	812
LS1	1102
X1	1103
JKA	894
JKB	895

Lampholders for:

ILP2	1100
ILP3	1101

Faston sockets 899

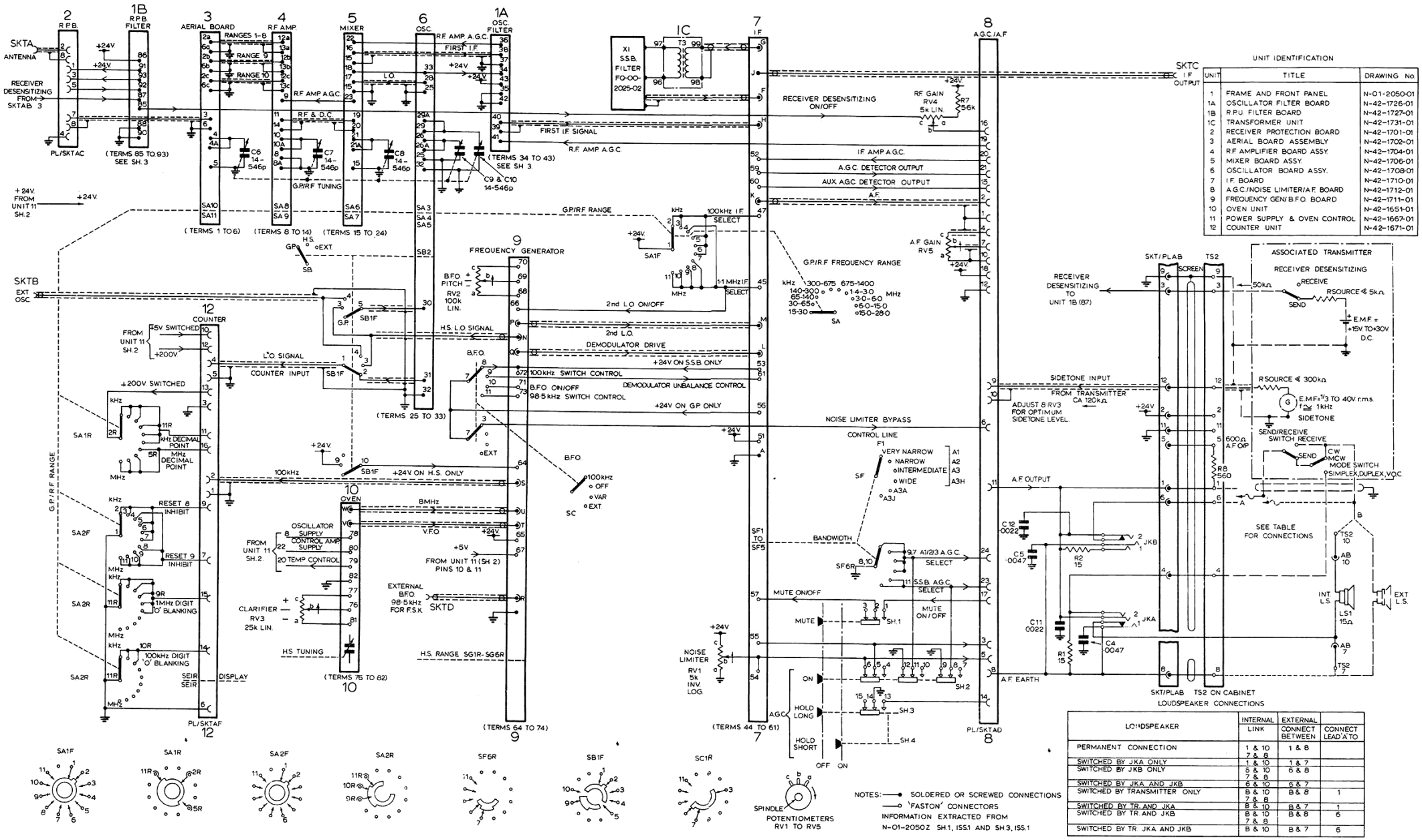


APOLLO RECEIVER
CIRCUIT DIAGRAM

UNIT 1

4.31

N/WD.6384/D Sh.1
ISSUE 3



UNIT IDENTIFICATION

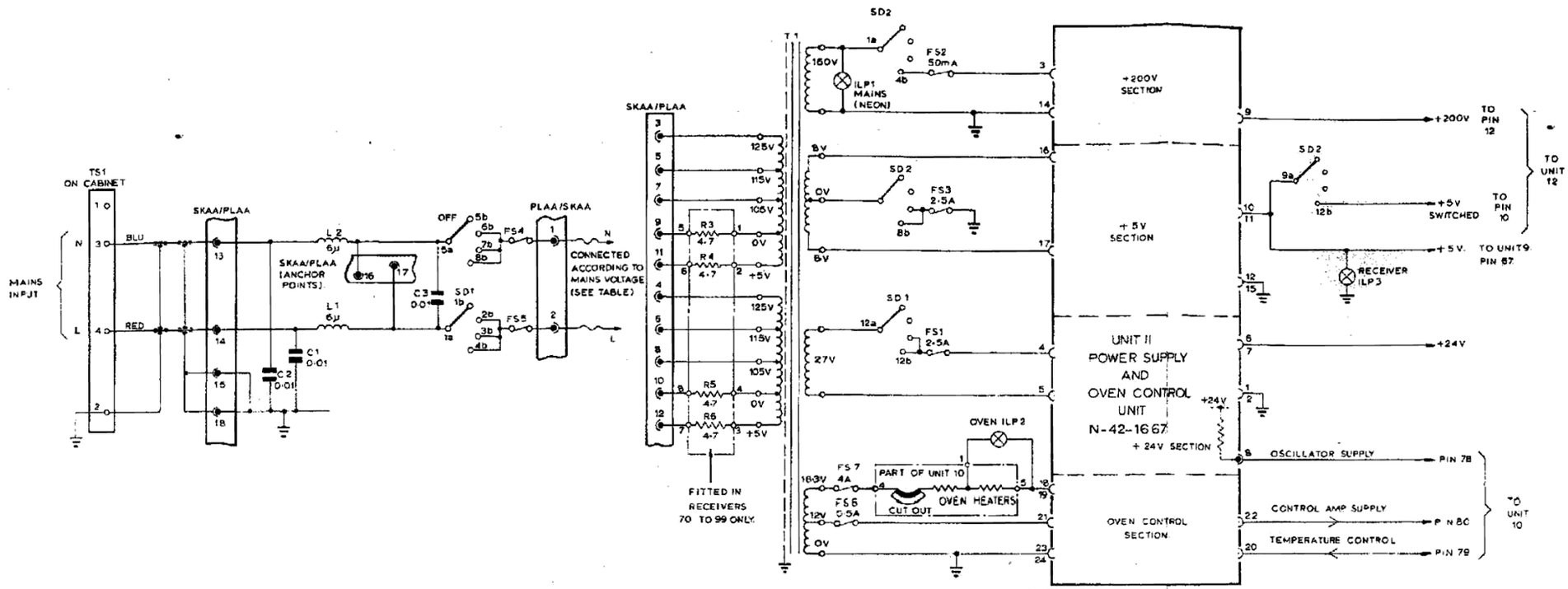
UNIT	TITLE	DRAWING No.
1	FRAME AND FRONT PANEL	N-01-2050-01
1A	OSCILLATOR FILTER BOARD	N-42-1726-01
1B	R.P.U. FILTER BOARD	N-42-1727-01
1C	TRANSFORMER UNIT	N-42-1731-01
2	RECEIVER PROTECTION BOARD	N-42-1701-01
3	AERIAL BOARD ASSEMBLY	N-42-1702-01
4	R.F. AMPLIFIER BOARD ASSY	N-42-1704-01
5	MIXER BOARD ASSY.	N-42-1706-01
6	OSCILLATOR BOARD ASSY.	N-42-1708-01
7	I.F. BOARD	N-42-1710-01
8	A.G.C./NOISE LIMITER/A.F. BOARD	N-42-1712-01
9	FREQUENCY GEN/B.F.O. BOARD	N-42-1711-01
10	OVEN UNIT	N-42-1651-01
11	POWER SUPPLY & OVEN CONTROL	N-42-1667-01
12	COUNTER UNIT	N-42-1671-01

LOUDSPEAKER	INTERNAL LINK	EXTERNAL CONNECT BETWEEN	EXTERNAL CONNECT LEAD 'A' TO
PERMANENT CONNECTION	1 & 10 7 & 8	1 & 8	
SWITCHED BY JKA ONLY	1 & 10	1 & 7	
SWITCHED BY JKB ONLY	6 & 10 7 & 8	6 & 8	
SWITCHED BY JKA AND JKB	6 & 10	6 & 7	
SWITCHED BY TRANSMITTER ONLY	B & 10 7 & 8	B & 8	1
SWITCHED BY TR. AND JKA	B & 10	B & 7	1
SWITCHED BY TR. AND JKB	B & 10 7 & 8	B & 8	6
SWITCHED BY TR. JKA AND JKB	B & 10	B & 7	6

HANDSET. CONNECT BETWEEN 1 AND 8.
IF NO L.S. IS USED, LINK 1 AND 4.

APOLLO RECEIVER
CIRCUIT DIAGRAM

N/WD.6384/D SH.1
ISSUE 1



OFF
OVEN
RECEIVER
COUNTER ON

SD1. SD2.

SWITCH SD

POWER SUPPLIES

LINKS ON MAINS SOCKET SKTAA				FUSES FS4 AND FS5
VOLTAGE 105 TO 130 LINE VOLTAGE	PRIMARY WINDINGS TO BE CONNECTED IN PARALLEL			
	PIN 1 TO PINS	PIN 2 TO PINS		
105	9 AND 10	7 AND 8		1A
110	11 AND 12	7 AND 8		
115	9 AND 10	5 AND 6		
120	11 AND 12	5 AND 6		
125	9 AND 10	3 AND 4		
130	11 AND 12	3 AND 4		
VOLTAGE 210 TO 260 LINE VOLTAGE	PRIMARY WINDINGS TO BE CONNECTED IN SERIES			0·5A
	PIN 1 TO PIN	PIN2 TO PIN	LINK PINS	
210	10	7	8 AND 9	
220	12	7	8 AND 11	
230	10	5	6 AND 9	
240	12	5	6 AND 11	
250	10	3	4 AND 9	
260	12	3	4 AND 11	

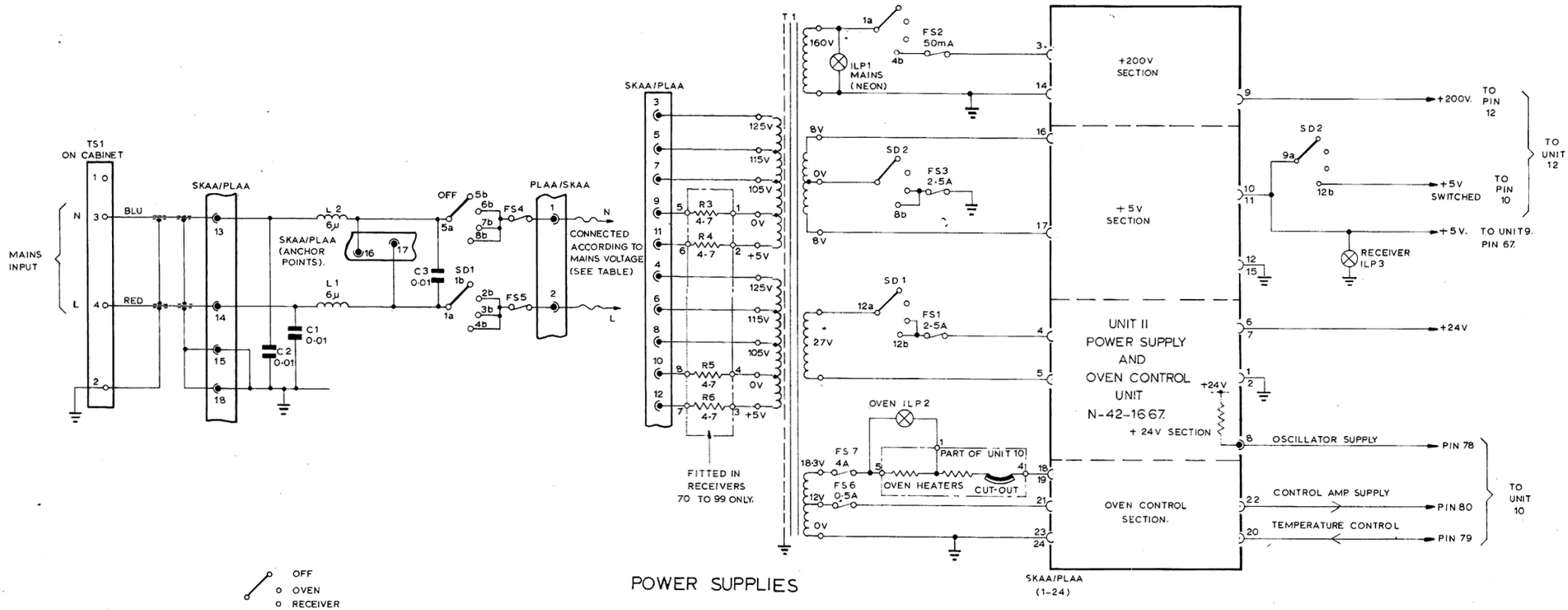
NOTES

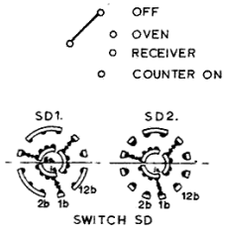
1. INFORMATION EXTRAGTED FROM N-01-2050Z SH 1 ISS 1 AND SH.3 ISS 1.
2. THE CROSS REFERENCE LIST FOR COMPONENTS ON THIS DIAGRAM WILL BE FOUND ON PAGE 4.30.

APOLLO RECEIVER
POWER SUPPLIES CIRCUIT DIAGRAM

UNIT 1

N/WD.6384/C Sh.2
ISSUE B



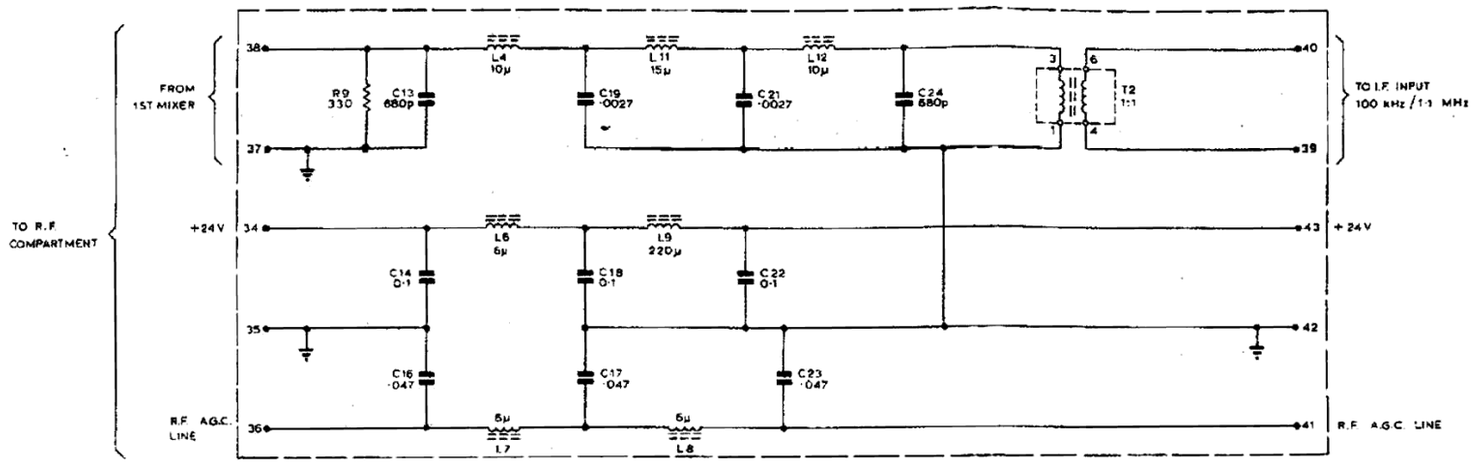


POWER SUPPLIES

LINKS ON MAINS SOCKET SKTAA				FUSES FS4 AND FS5
VOLTAGE 105 TO 130 LINE VOLTAGE	PRIMARY WINDINGS TO BE CONNECTED IN PARALLEL			
	PIN 1 TO PINS	PIN 2 TO PINS		
105	9 AND 10	7 AND 8		1A
110	11 AND 12	7 AND 8		
115	9 AND 10	5 AND 6		
120	11 AND 12	5 AND 6		
125	9 AND 10	3 AND 4		
130	11 AND 12	3 AND 4		
VOLTAGE 210 TO 260 LINE VOLTAGE	PRIMARY WINDINGS TO BE CONNECTED IN SERIES			0·5A
	PIN 1 TO PIN	PIN 2 TO PIN	LINK PINS	
210	10	7	8 AND 9	
220	12	7	8 AND 11	
230	10	5	6 AND 9	
240	12	5	6 AND 11	
250	10	3	4 AND 9	
260	12	3	4 AND 11	

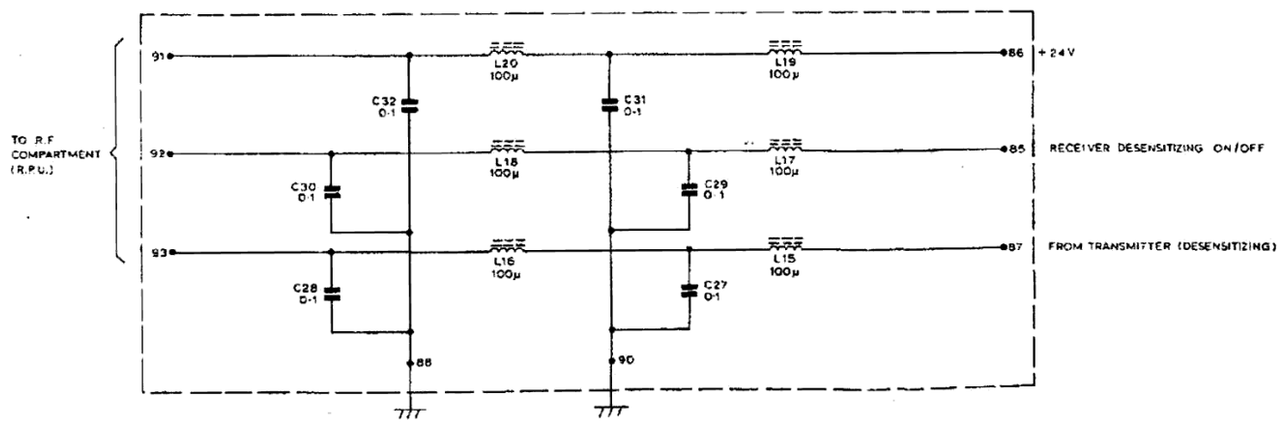
NOTE. INFORMATION EXTRACTED FROM N-01-2050Z SH. 1 ISS.1 AND SH.3 ISS. 1.

APOLLO RECEIVER
POWER SUPPLIES CIRCUIT DIAGRAM

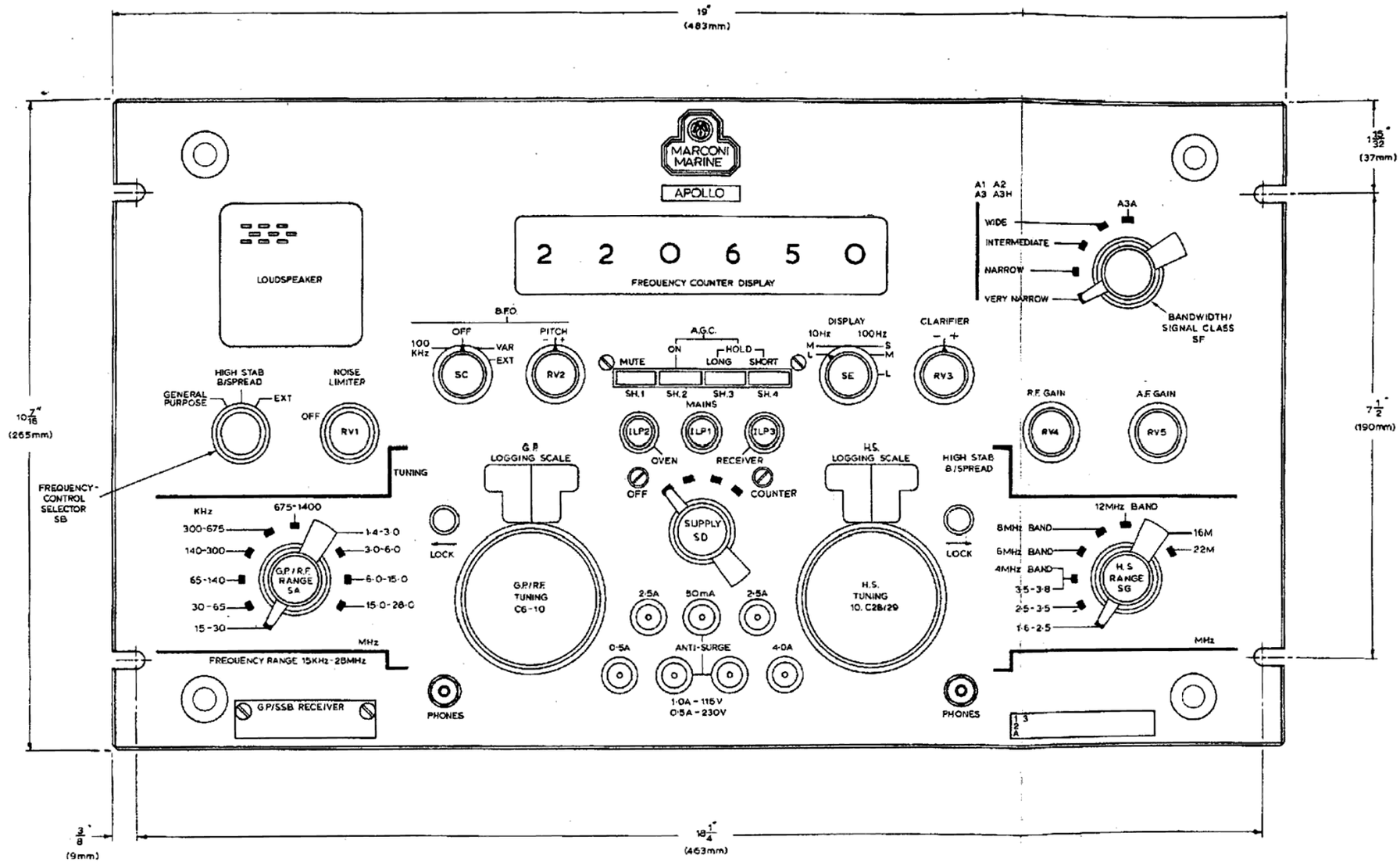


FRONT END FILTER BOARD N-42-1726-01 (SUB-UNIT 1A)

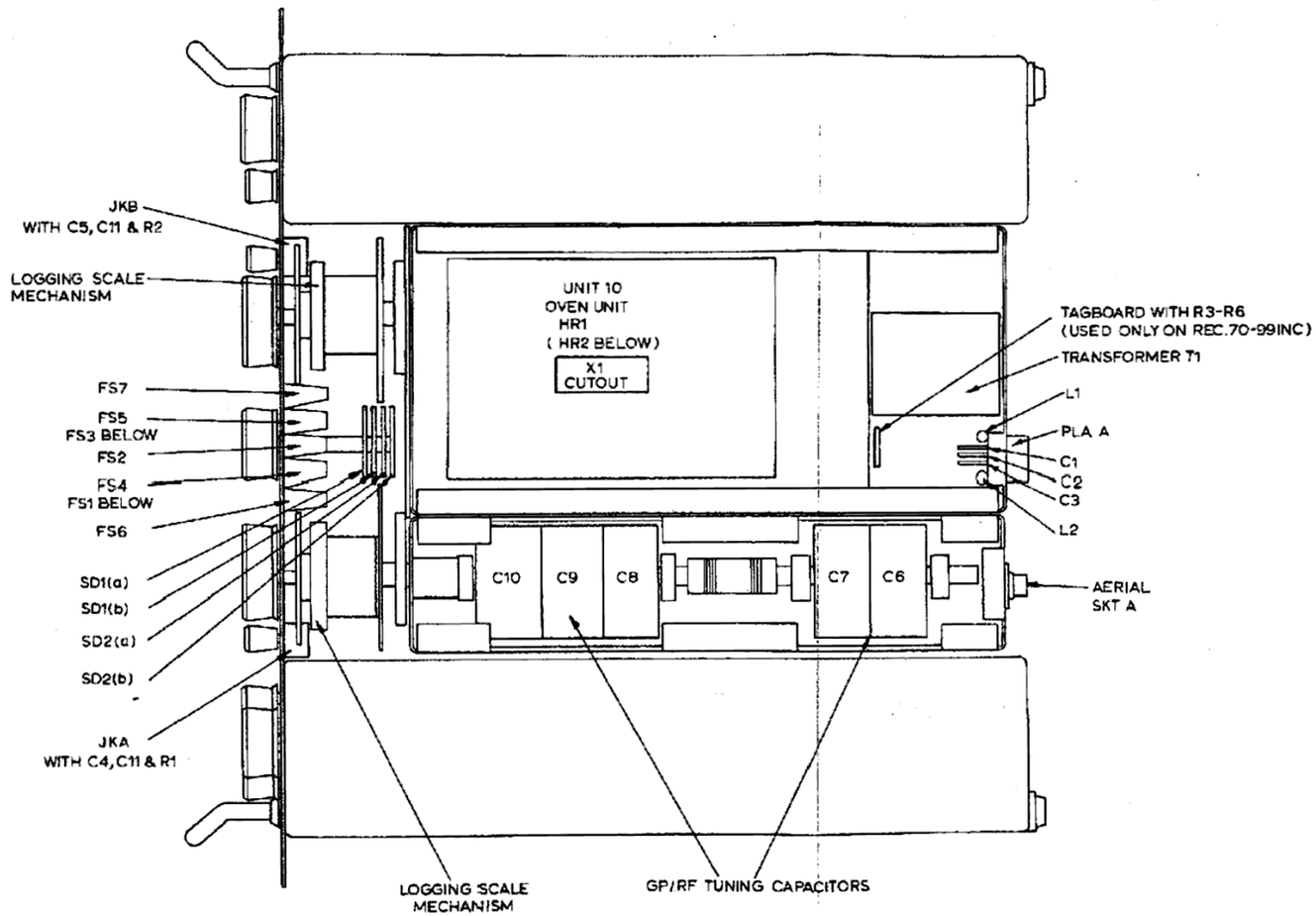
NOTES THE CROSS REFERENCE LIST FOR COMPONENTS ON THIS DIAGRAM WILL BE FOUND ON PAGE 4.30.



R.P.U. FILTER BOARD N-42-1727-01 (SUB-UNIT 1B)

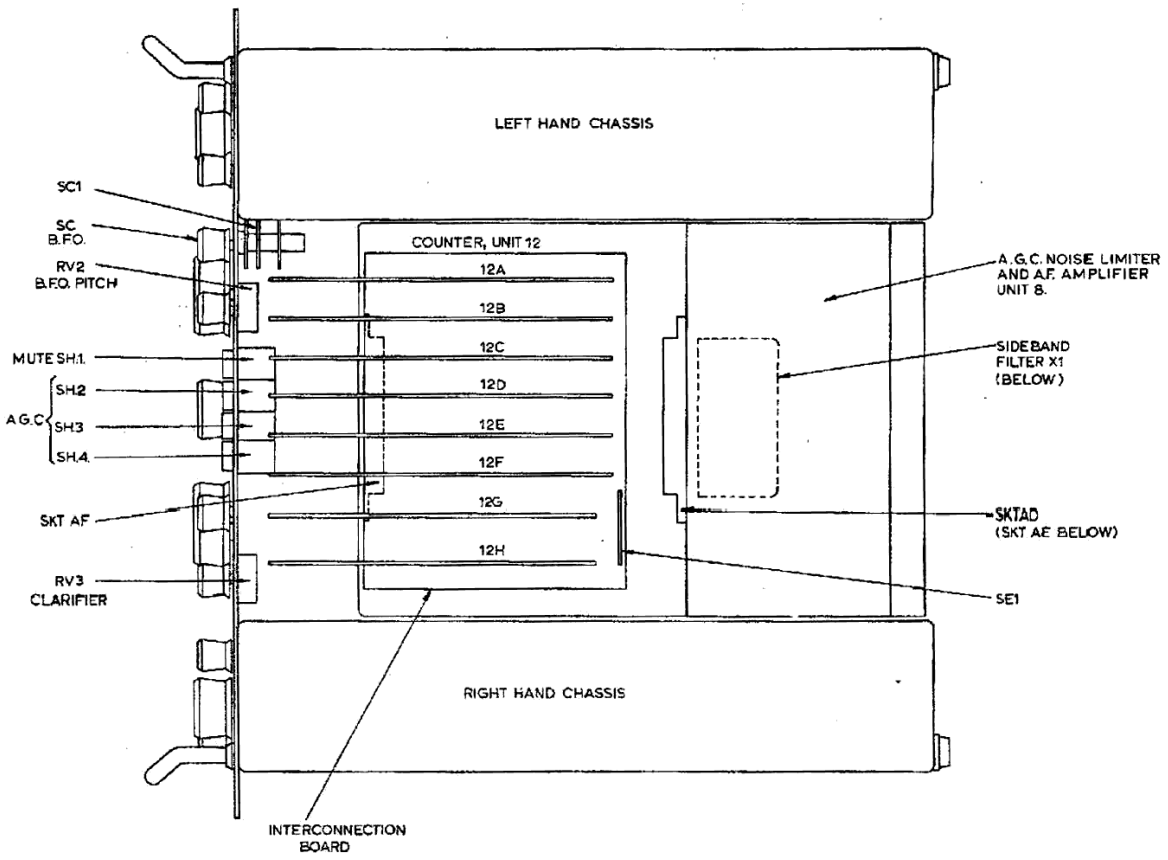


APOLLO RECEIVER
FRONT PANEL LAYOUT

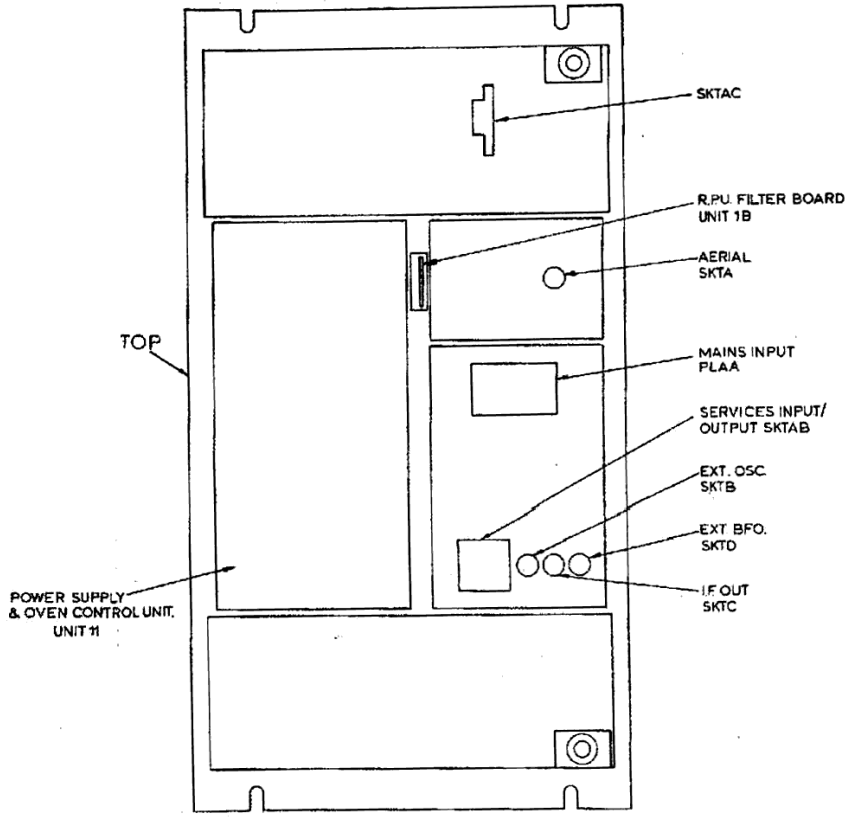


UNDER SIDE VIEW

APOLLO RECEIVER
COMPONENT LOCATION



PLAN VIEW



REAR VIEW

APOLLO RECEIVER
COMPONENT LOCATION

Cross Reference List

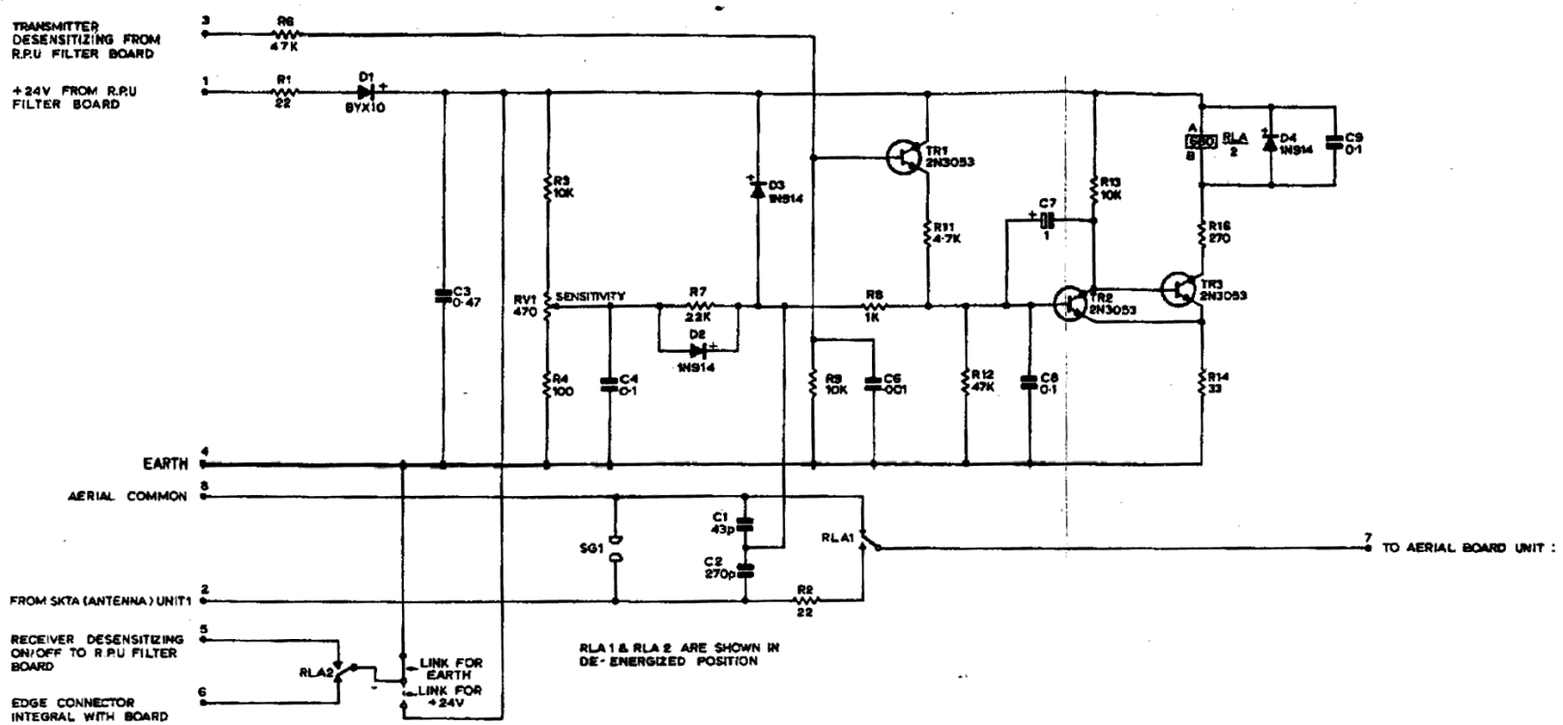
for

Apollo Receiver

Receiver Protection Unit N-42-1701-01

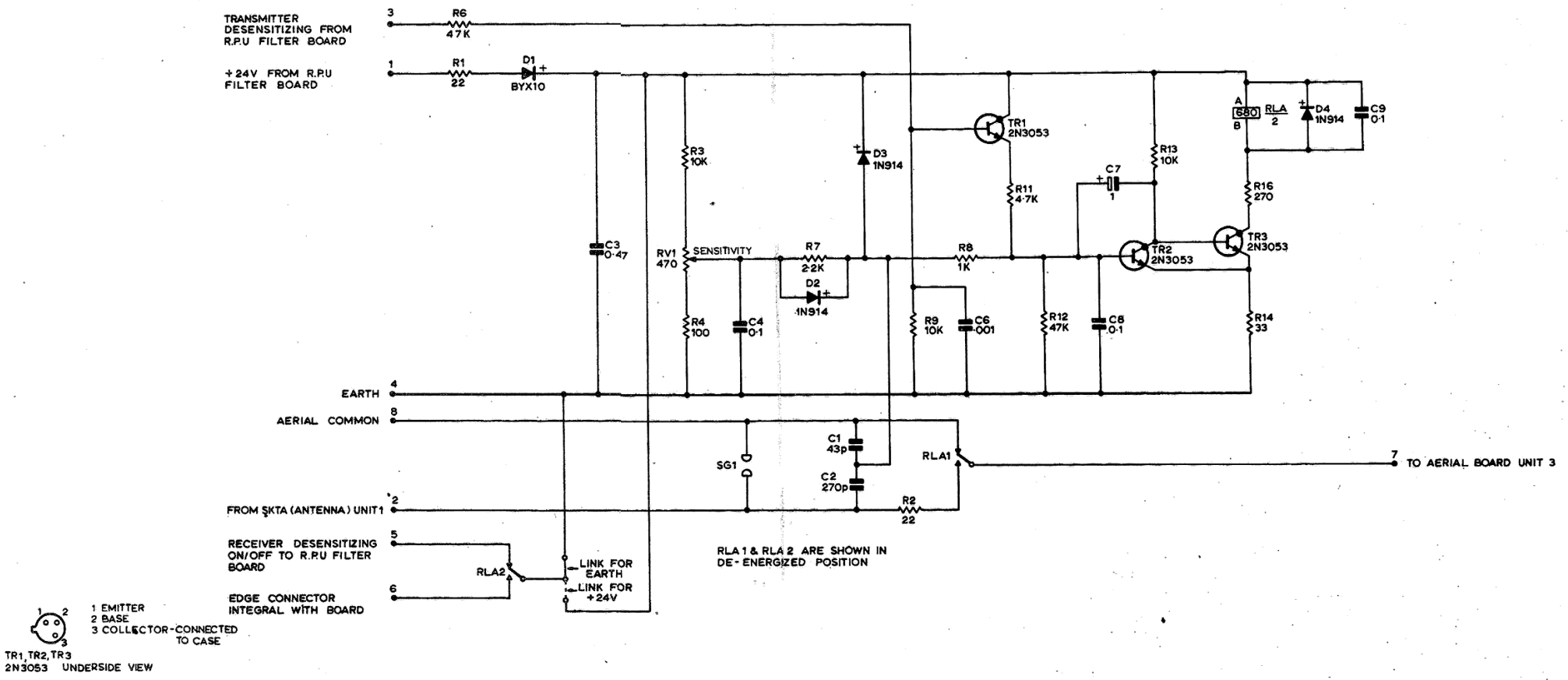
Circuit Diagram (Unit 2)

Ref.	M.C.L. No.
C1	10
C2	11
C3	12
C4	7
C6	13
C7	37
C8	7
C9	7
R1	252
R2	253
R3	254
R4	255
R6	256
R7	257
R8	258
R9	254
R11	259
R12	256
R13	254
R14	260
R16	261
RV1	463
D1	650
D2	651
D3	651
D4	651
RLA	1104
SG1	1105
TR1	705
TR2	705
TR3	705



RECEIVER PROTECTION UNIT N-42-1701-01
CIRCUIT DIAGRAM

UNIT 2



N2050 G.P/SSB RECEIVER

UNIT 2 RECEIVER PROTECTION UNIT N-42-1701-01, CIRCUIT

N-42-1701Z SH.1
ISSUE 1

Cross Reference List

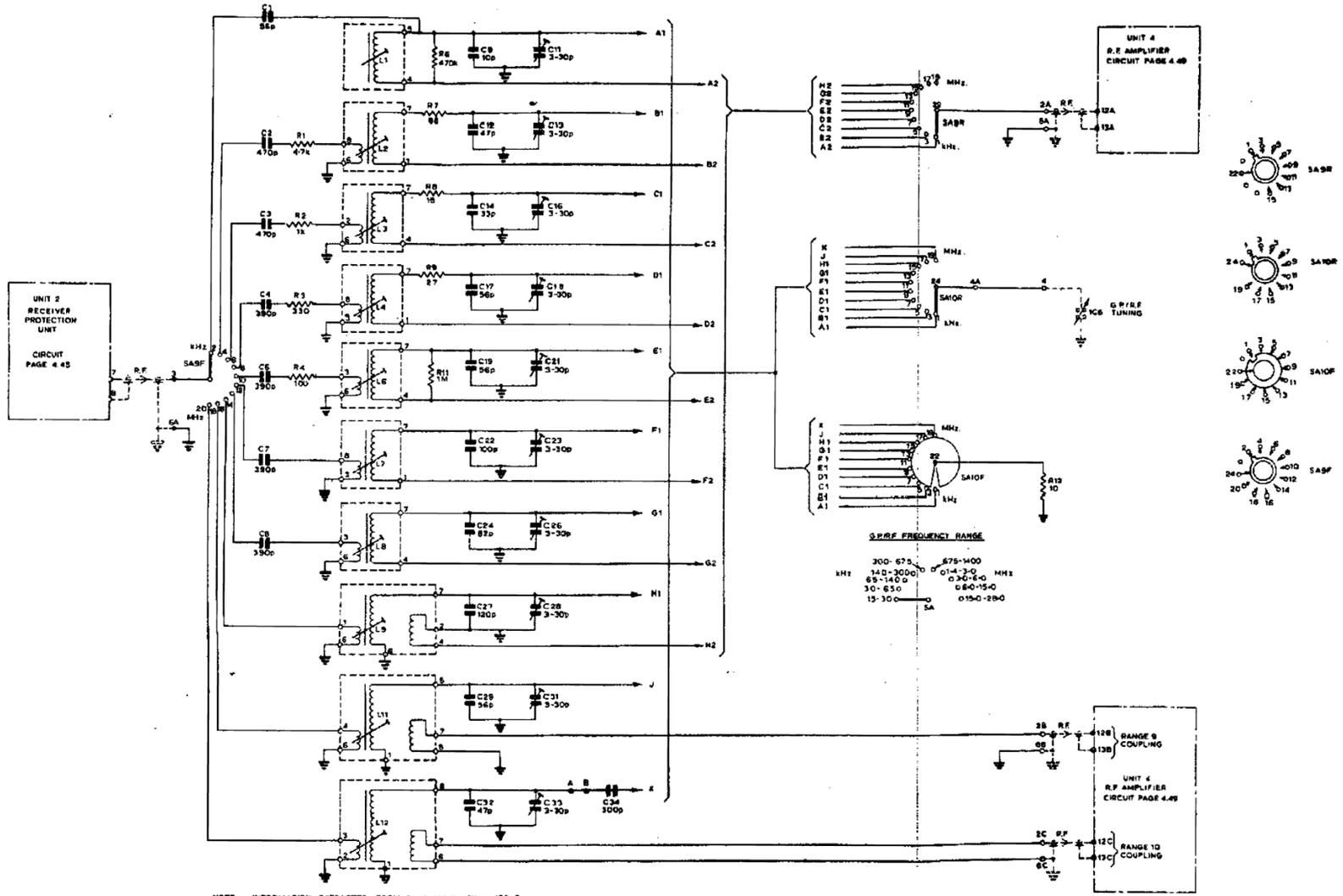
for

Apollo Receiver

Aerial Board Assembly N-42-1702-01

Circuit Diagram (Unit 3)

Ref.	M.C.L. No.	Ref.	M.C.L. No.
C1	15	L9	512
C2	16	L11	513
C3	16	L12	514
C4	17		
C6	17		
C7	17	SA9	955
C8	17	SA10	956
C9	18		
C11	19		
C12	25		
C13	19		
C14	21		
C16	19		
C17	20		
C18	19		
C19	20		
C21	19		
C22	22		
C23	19		
C24	38		
C26	19		
C27	24		
C28	19		
C29	20		
C31	19		
C32	25		
C33	19		
C34	26		
R1	262		
R2	263		
R3	264		
R4	265		
R6	266		
R7	267		
R8	268		
R9	269		
R11	270		
R12	271		
L1	505		
L2	506		
L3	507		
L4	508		
L6	509		
L7	510		
L8	511		

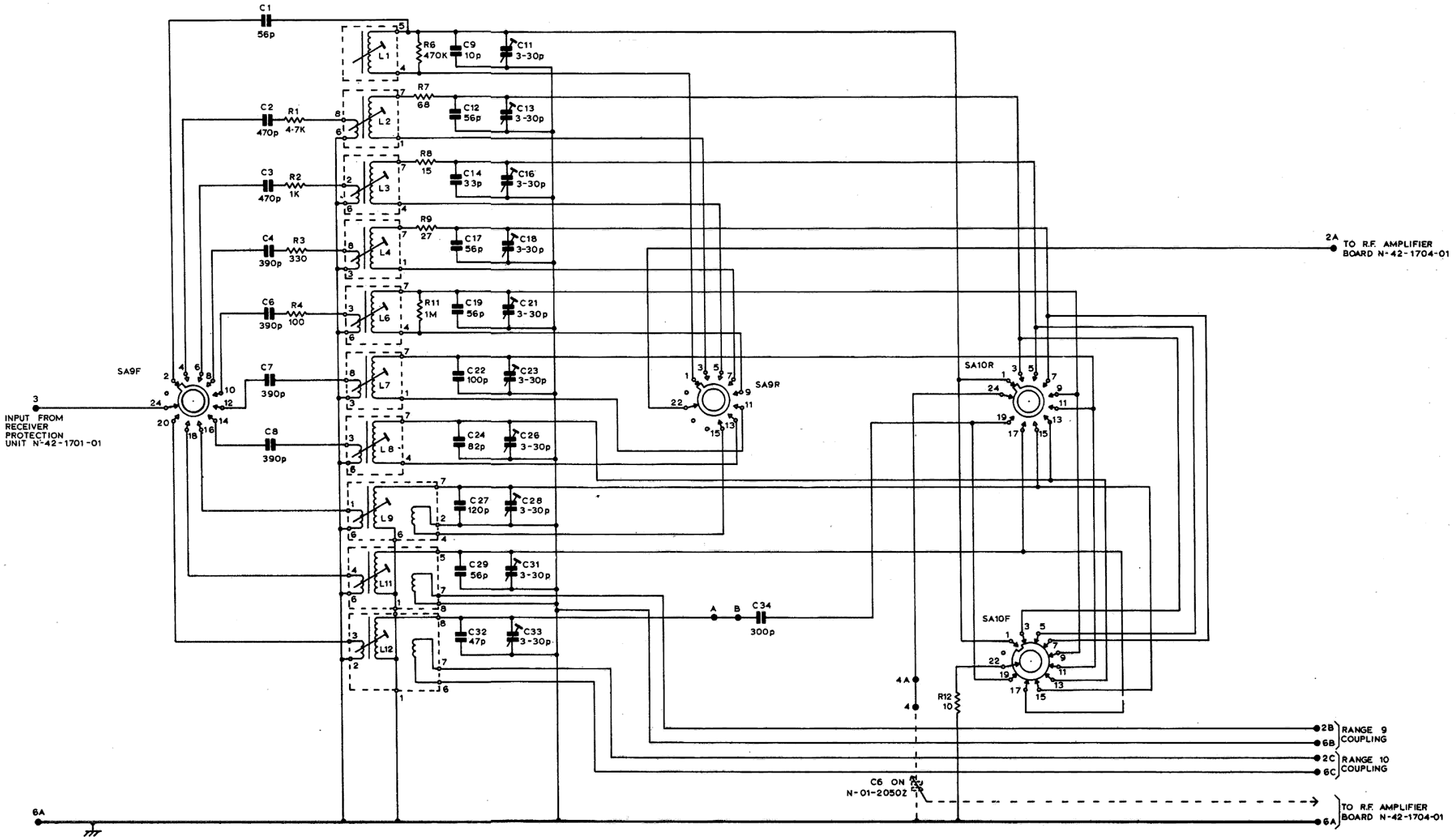


AERIAL BOARD N-42-1702-01
CIRCUIT DIAGRAM

UNIT 3

4.47

N/WD.7007/D Sh.1
ISSUE 1



N-42-1702Z, SH. 1,
ISSUE 1

N2050 G.P./S.S.B. RECEIVER

UNIT 3 AERIAL BOARD ASSY.
N-42-1702-01 CIRCUIT

Cross Reference List

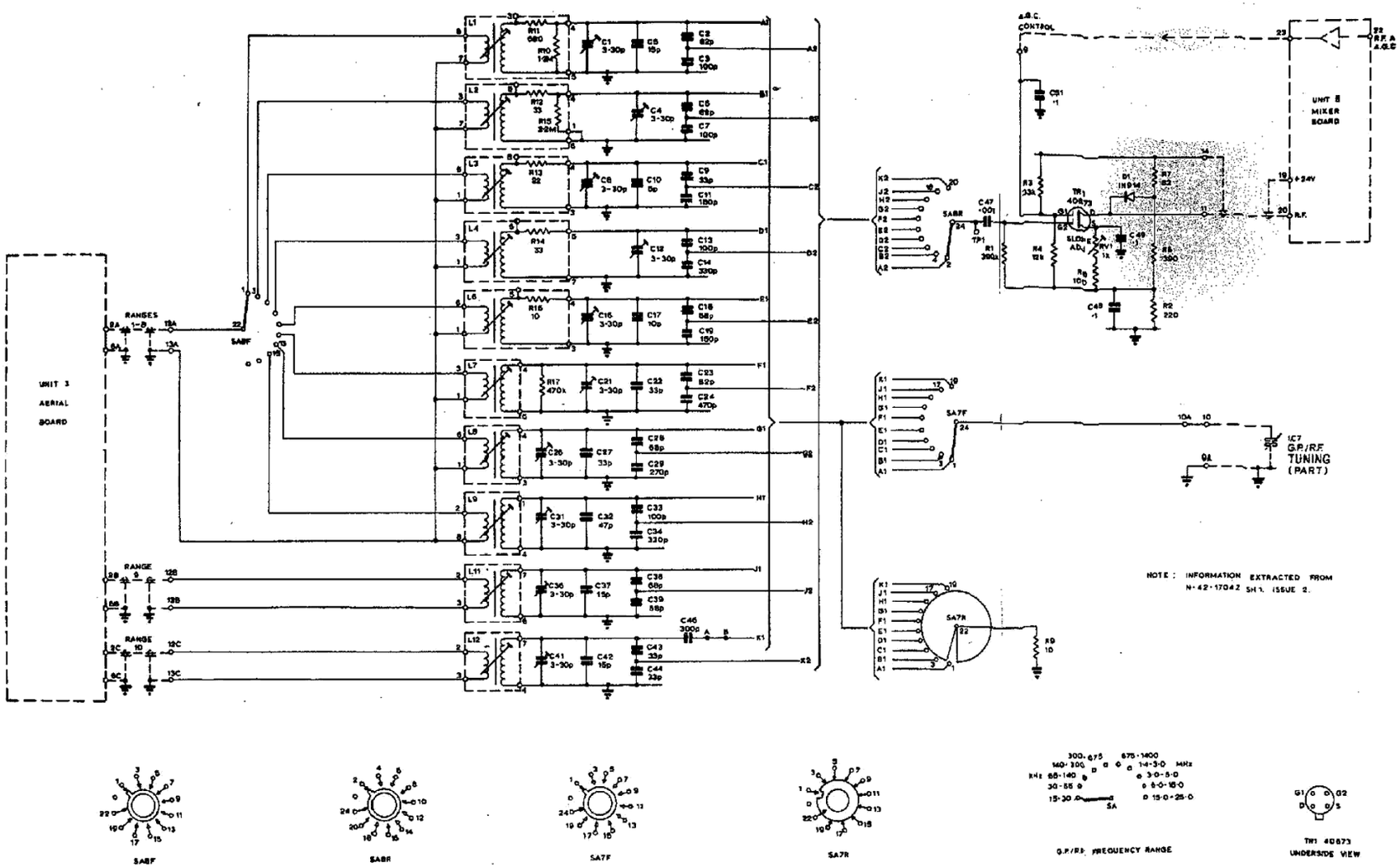
for

Apollo Receiver

R.F. Amplifier Board N-42-1704-01

Circuit Diagram (Unit 4)

Ref.	M.C.L. No.	Ref.	M.C.L. No.
C1	19	R1	272
C2	38	R2	273
C3	22	R3	274
C4	19	R4	275
C5	47	R6	265
C6	38	R7	276
C7	22	R8	277
C8	19	R9	271
C9	21	R10	278
C10	27	R11	279
C11	28	R12	280
C12	19	R13	281
C13	22	R14	280
C14	29	R15	282
C16	19	R16	283
C17	18	R17	266
C18	30	RV1	457
C19	31		
C21	19		
C22	21	L1	515
C23	38	L2	516
C24	32	L3	517
C26	19	L4	518
C27	21	L6	519
C28	30	L7	520
C29	33	L8	521
C31	19	L9	522
C32	25	L11	523
C33	22	L12	524
C34	29		
C36	19		
C37	47	D1	651
C38	30		
C39	30		
C41	19	TR1	703
C42	47		
C43	21		
C44	21	SA7	972
C46	26	SA8	973
C47	43		
C48	7		
C49	7		
C51	7		



SA8F

SA8R

SA7F

SA7R

G.P./R.F. FREQUENCY RANGE

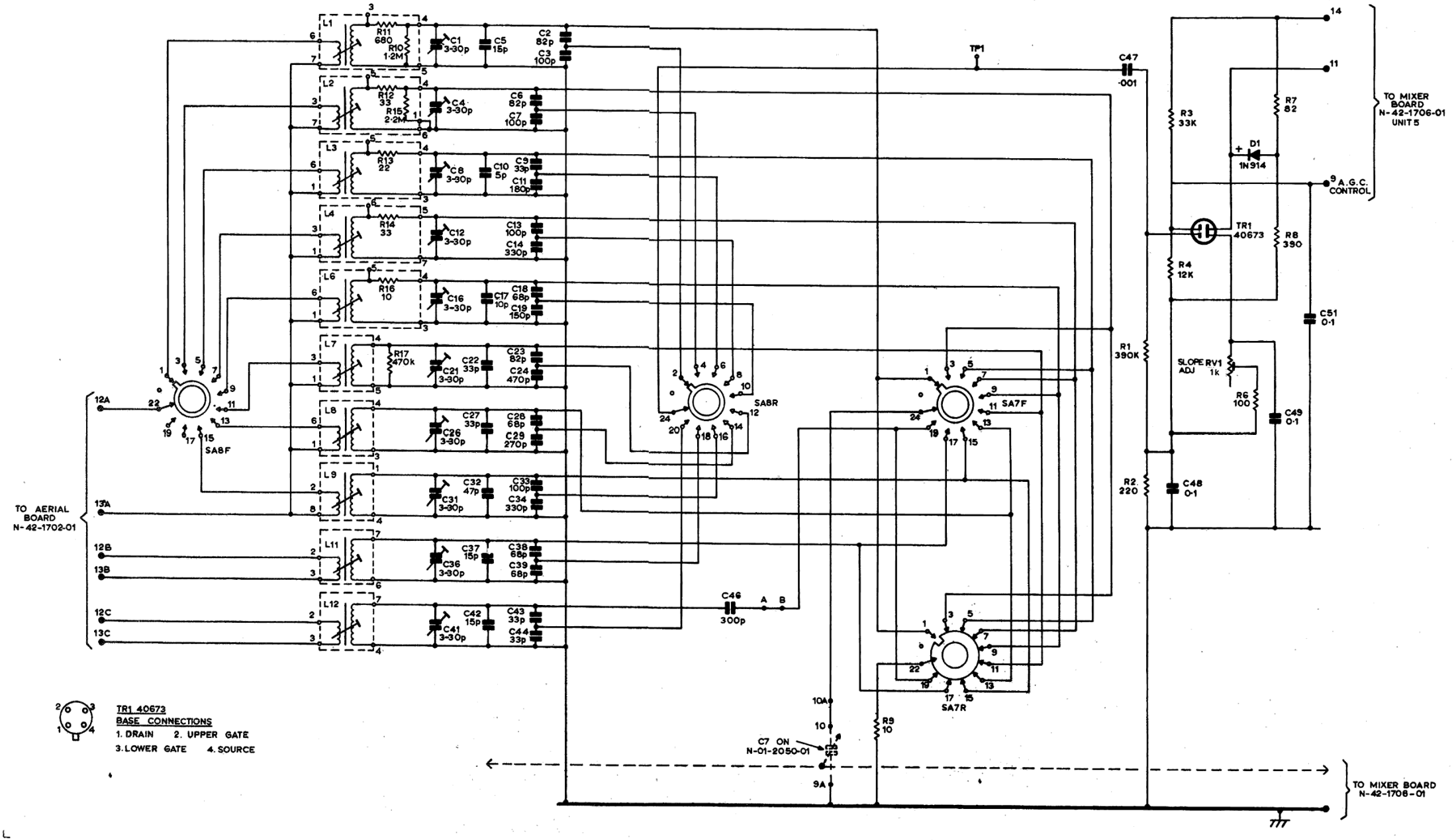
TR1 40673
UNDERSIDE VIEW

R. F. AMPLIFIER BOARD N-42-1704-
CIRCUIT DIAGRA

UNIT

4.4

N/WD.7035/D Sh.1
ISSUE 1



N2050 G.P/S.S.B. RECEIVER

UNIT 4. R.F. AMPLIFIER UNIT
N-42-1704-01, CIRCUIT.

N-42-1704 Z SH.1.
ISSUE 1

Cross Reference List

for

Apollo Receiver
Mixer Board N-42-1706-01
Circuit Diagram (Unit 5)

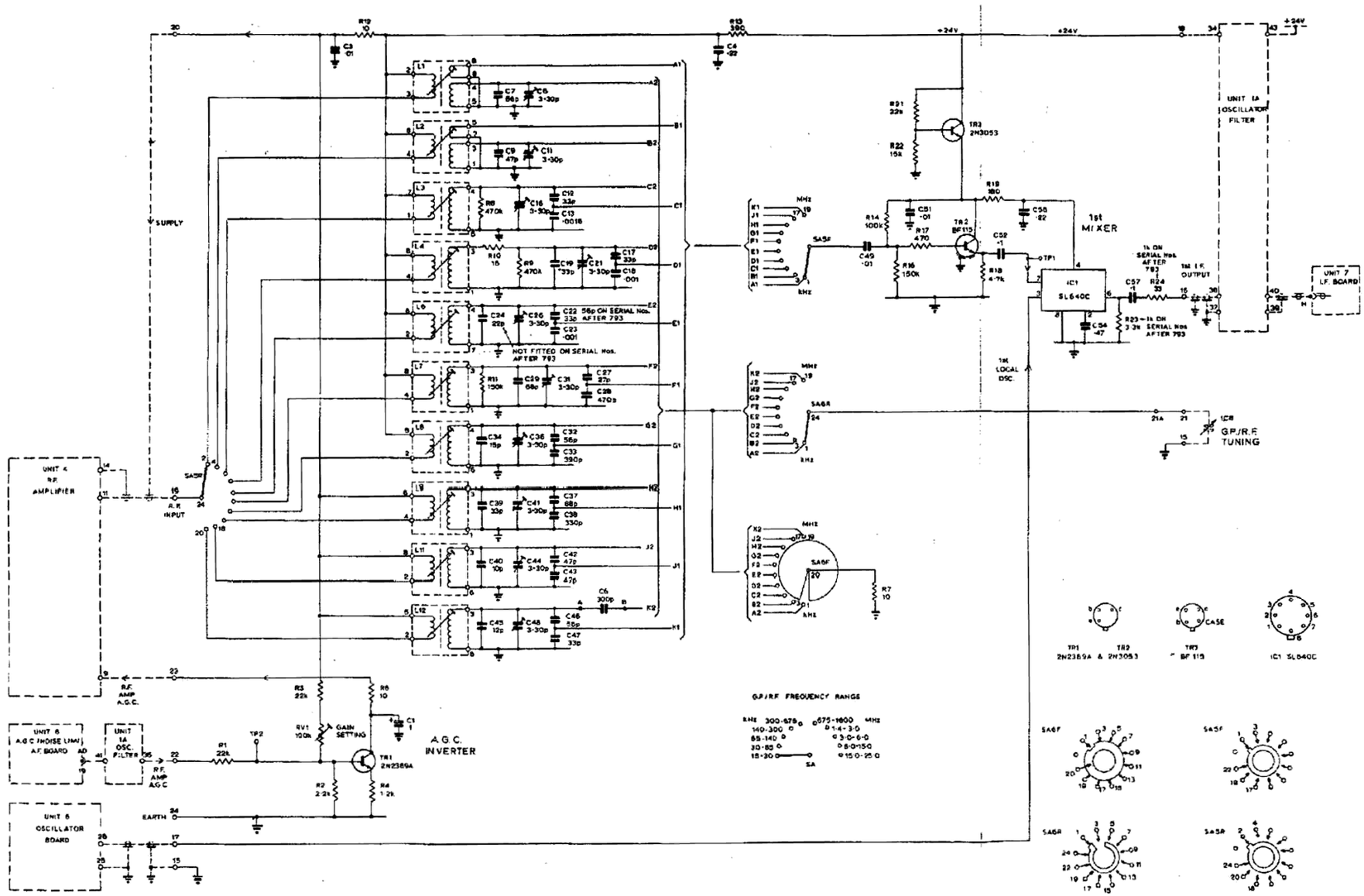
Ref.	M.C.L. No.	Ref.	M.C.L. No.
C1	37	R1	285
C3	1	R2	286
C4	39	R3	285
C6	26	R4	287
C7	20	R6	271
C8	19	R7	271
C9	25	R8	266
C11	19	R9	266
C12	21	R10	268
C13	42	R11	289
C16	19	R12	271
C17	21	R13	277
C18	43	R14	290
C19	21	R16	289
C21	19	R17	291
‡ C22	21	R18	259
C23	43	R19	293
‡ ‡C24	44	R21	257
C26	19	R22	295
C27	45	* R23	296
C28	32	** R24	291
C29	30		
C31	19	RV1	464
C32	20		
C33	46	L1	525
C34	47	L2	526
C36	19	L3	527
C37	30	L4	528
C38	48	L6	529
C39	21	L7	530
C40	18	L8	531
C41	19	L9	532
C42	25	L11	533
C43	25	L12	534
C44	19		
C45	50	TR1	704
C46	20	TR2	701
C47	21	TR3	705
C48	19		
C49	51	IC1	758
C51	51		
C52	7	SA5	974
C54	12	SA6	975
C56	39		
C57	7		

*MCL No.263 for S/Nos. after 793.

**MCL No.265 for S/Nos. after 793.

‡ MCL No.20 for S/Nos. after 793.

‡ ‡ Not used on S/Nos. after 793.

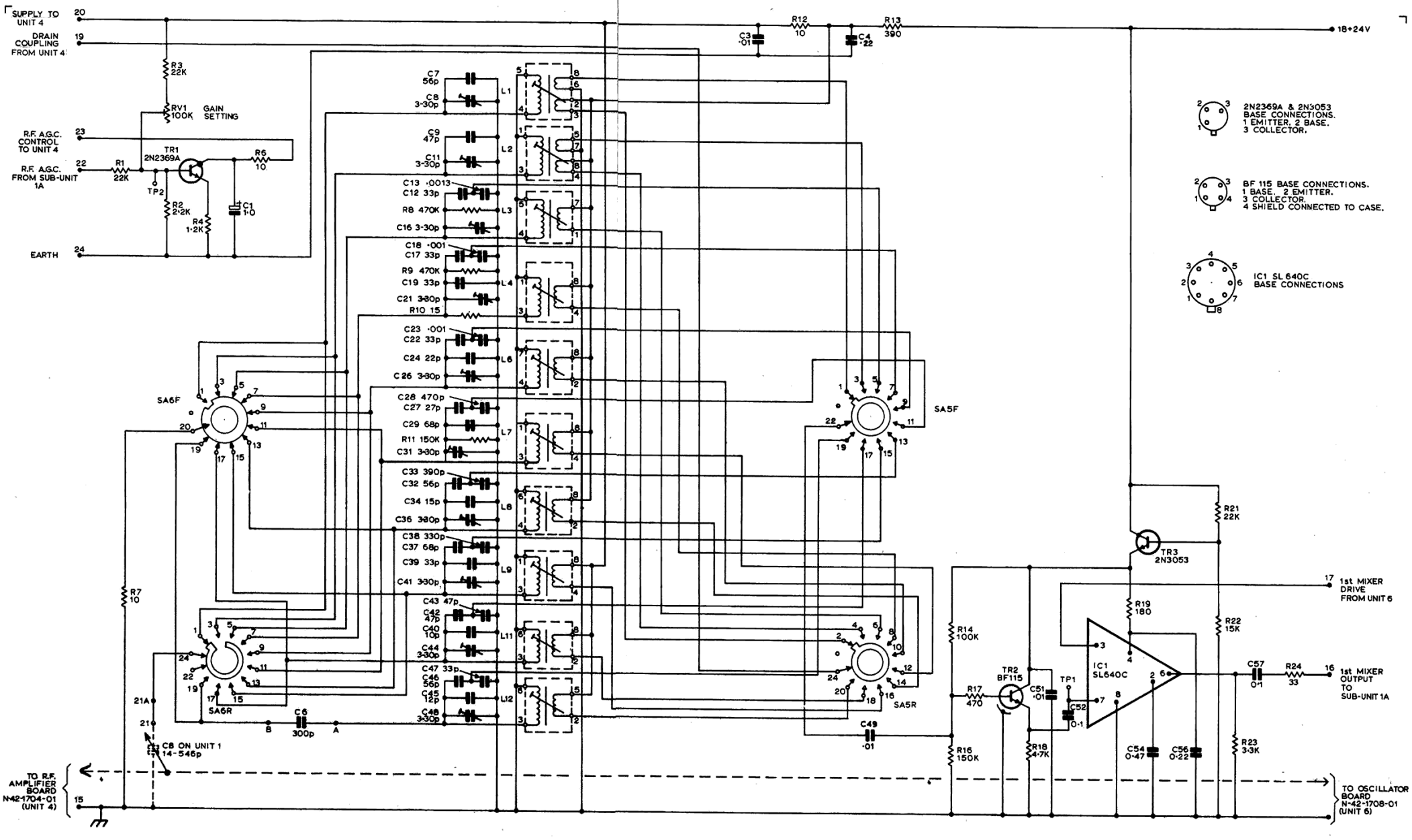


MIXER BOARD N-42-1706-01
CIRCUIT DIAGRAM

UNIT 5

4.51

N/WD.2012/D.Sh.1
ISSUE 2



N-42-1706Z SH.1
ISSUE 1

N2050 G.P./S.S.B. RECEIVER

UNIT 5 MIXER BOARD N-42-1706-01 CIRCUIT.

Cross Reference List

for

Apollo Receiver

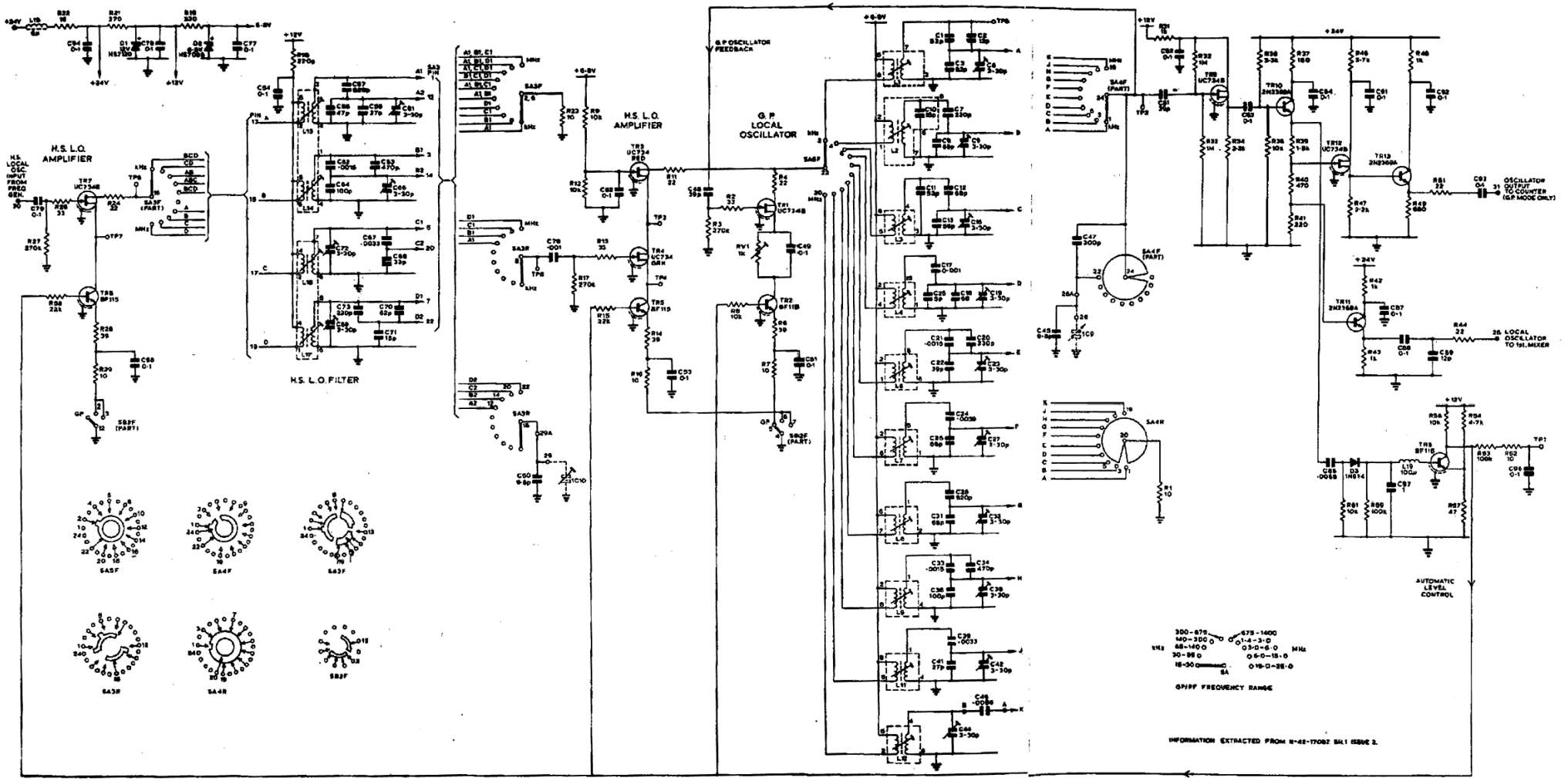
R.F. Oscillator Board N-42-1708-01

Circuit Diagram (Unit 6)

Ref.	M.C.L. No.	Ref.	M.C.L. No.	Ref.	M.C.L. No.
C1	38	C64	22	R23	297
C2	50	C66	19	R24	300
C3	38	C67	66	R26	284
C6	19	C68	21	R27	299
C7	53	C69	19	R28	301
C8	30	C70	67	R29	297
C9	19	C71	47	R31	258
C10	47	C72	19	R32	270
C11	54	C73	68	R33	270
C12	30	C76	69	R34	304
C13	20	C77	7	R36	305
C16	19	C78	7	R37	306
C17	43	C79	7	R38	254
C18	30	C81	56	R39	307
C19	19	C82	7	R40	291
C20	29	C83	7	R41	309
C21	55	C84	7	R42	263
C22	56	C86	70	R43	263
C23	19	C87	7	R44	300
C24	57	C88	7	R46	310
C25	27	C89	50	R47	304
C26	30	C91	7	R48	258
C27	19	C92	7	R49	279
C28	58	C93	7	R51	300
C31	30	C94	7	R52	297
C32	19	C96	7	R53	312
C33	77	C97	71	R54	259
C34	32	C98	7	R56	254
C36	22			R57	298
C38	19	R1	297	R58	257
C39	59	R2	284	R59	312
C41	45	R3	299	R61	254
C42	19	R4	300		
C44	19	R6	301	RV1	457
C45	61	R7	297		
C46	62	R8	254	L1	535
C47	26	R9	254	L2	536
C48	56	R11	300	L3	537
C49	7	R12	254	L4	538
C50	61	R13	284	L6	539
C51	7	R14	301	L7	540
C52	7	R15	257	L8	541
C53	7	R16	297	L9	542
C54	7	R17	299	L11	543
C57	64	R18	273	L12	544
C58	25	R19	264	L13 & L14	545
C59	45	R21	303	L16 & L17	546
C61	19	R22	268	L18	500
C62	65			L19	504
C63	16				

Cross Reference List for Unit 6 cont.

Ref.	M.C.L. No.
TR1	700
TR2	701
TR3 }	702
TR4 }	
TR5	701
TR6	701
TR7	700
TR8	701
TR9	700
TR10	704
TR11	704
TR12	700
TR13	704
D1	655
D2	654
D3	651
SA3	957
SA4	958
SA5	959
SB2	960



R. F. OSCILLATOR N-42-1708-01
CIRCUIT DIAGRAM

UNIT 6

4:66

N/WD.7013/D Sh. 1
ISSUE 1

SA5F/SA6F SELECTS O/P.
SA6R EARTHS THE CCTS NOT REQUIRED
CL17 REDUCES THE CAPACITY ON THE HIGHER RANGE TO
CL18 PROVIDES THE FEEDBACK TO MAINTAIN OSCILLATIONS

TR1 & 4 & 5
TR1 GP OSC TUNED GATE
TR2 CONTROLS GAIN OF TR1
TR3 IS COMMON GATE AMP
TR4 COMMON SOURCE AMP
TR5 CONTROLS GAIN OF TR4

RV1 ADJUSTS THE DC LEVELS SINCE ONLY 1 FET USED

TR7 & TR8
TR7 COMMON SOURCE AMP
TR8 CONTROLS THE GAIN OF TR7.
SA3F/R23 EARTHS THE O/P NOT REQUIRED.
SA3R SELECTS THE FILTER O/P & CONNECTS C10

A. ECCLESTON

L13/17 ONLY EFFECTIVE ON HIGH RANGES.

TR8 CONTROLS THE GAIN OF FET TR7.

TR6 ALC
TRANSISTOR EMITTER VOLTAGE CONTROLS THE C/E RESISTANCE OF TR5 & 7.

UC734B
BASE CONNECTIONS
1. SOURCE 2. DRAIN 3. GATE 4. SCREEN

BF115 BASE CONNECTIONS
1. BASE 2 EMITTER 3. COLLECTOR
4. SHIELD CONNECTED TO CASE

2N2369A
BASE CONNECTIONS
1. EMITTER 2. BASE 3. COLLECTOR

NOTE:- C9 & C10 ARE PART OF CHASSIS ASSY. N-42-1665-01

C9 TUNES ON G/P
C10 TUNES ON H/S

N2050 G.P./S.S.B. RECEIVER

UNIT 6. R.F. OSCILLATOR N-42-1708-01 CIRCUIT.

Cross Reference List

for

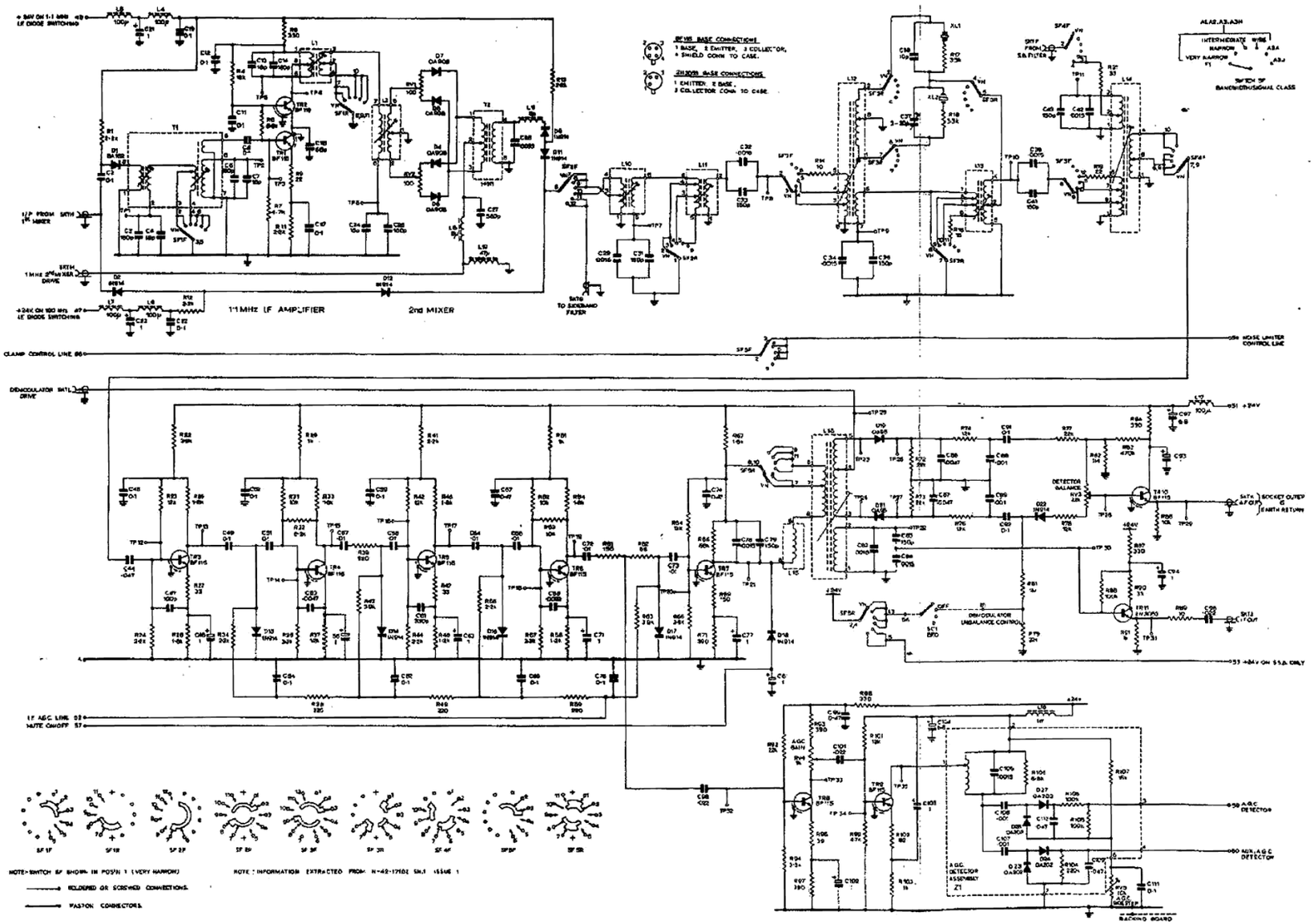
Apollo Receiver

I.F. Board N-42-1710-01
Circuit Diagram (Unit 7)

Ref.	M.C.L. No.	Ref.	M.C.L. No.	Ref.	M.C.L No.
C2	7	C64	82	R12	286
C3	72	C66	82	R13	286
C4	73	C67	12	R14	271
C6	72	C68	84	R16	268
C7	73	C69	7	R17	296
C8	7	C71	37	R18	296
C11	7	C72	82	R19	252
C12	7	C73	82	R21	260
C13	73	C74	12	R22	314
C14	72	C76	7	R23	275
C16	74	C77	37	R24	286
C17	7	C78	77	R26	315
C19	7	C79	78	R27	260
C21	37	C81	37	R28	315
C22	7	C82	77	R29	263
C23	37	C83	78	R31	317
C24	73	C84	77	R32	313
C26	72	C86	81	R33	315
C27	75	C87	81	R34	286
C28	59	C88	43	R36	296
C29	77	C89	43	R37	287
C31	78	C91	7	R38	273
C32	77	C92	7	R39	273
C33	78	C93	37	R41	286
C34	77	C94	37	R42	275
C36	78	C96	85	R43	314
C37	19	C97	86	R44	286
C38	79	C98	85	R46	315
C39	77	C99	12	R47	260
C41	78	C101	85	R48	287
C42	77	C102	37	R49	273
C43	78	C103	37	R51	263
C44	8	C104	86	R52	317
C46	7	C106	55	R53	317
C47	22	C107	43	R54	315
C48	37	C108	43	R56	286
C49	7	C109	8	R57	296
C51	7	C111	7	R58	287
C52	7	C112	8	R59	273
C53	81			R61	319
C54	7			R62	320
C56	37	R1	286	R63	314
C57	82	R4	275	R64	275
C58	82	R6	313	R66	286
C59	7	R7	262	R67	321
C61	48	R8	264	R68	322
C62	7	R9	252	R69	319
C63	37	R11	286	R71	277

Cross Reference List for Unit 7 cont.

Ref.	M.C.L. No.	Ref.	M.C.L. No.	Ref.	M.C.L. No.
R72	285	L12	552	SKTL	896
R73	285	L13	553	SKTM	896
R74	275	L14	554		
R76	275	L15	555		
R77	285	L16	556	SF1	961
R78	275	L17	504	SF2	962
R79	285	L18	557	SF3	963
R81	270	L19	558	SF4	964
R82	270			SF5	965
R83	266				
R84	264	D1	653		
R86	317	D2	651	T1	1056
R87	264	D4)		T2	1057
R88	290	D6)	656		
R89	271	D7)			
R90	260	D8)		XL1	1115
R91	263	D9	651	XL2	1116
R92	285	D11	651	Z1	1108
R93	277	D12	651		
R94	296	D13	651	Sockets for	
R96	324	D14	651	XL1 & XL2	898
R97	277	D16	651		
R98	264	D17	651	Faston single	
R99	262	D18	651	pole plugs	843
R101	275	D19	657		
R102	276	D21	657		
R103	263	D22	651		
R104	326	D23	658		
R105	327	D24	658		
R106	312	D26	658		
R107	295	D27	658		
R108	312				
		TR1	701		
RV1	455	TR2	701		
RV2	455	TR3	701		
RV3	456	TR4	701		
RV4	457	TR5	701		
RV5	458	TR6	701		
		TR7	701		
		TR8	701		
L1	548	TR9	701		
L2	549	TR10	701		
L4	504	TR11	705		
L5	504				
L6	504				
L7	504	SKTF	896		
L8	500	SKTG	896		
L9	500	SKTH	896		
L10	550	SKTJ	896		
L11	551	SKTK	896		



I. F. BOARD N-42-1710-01
CIRCUIT DIAGRAM

UNIT 7

4.59

N/WD.6379/D Sh.1
ISSUE 2

Cross Reference List

for

Apollo Receiver

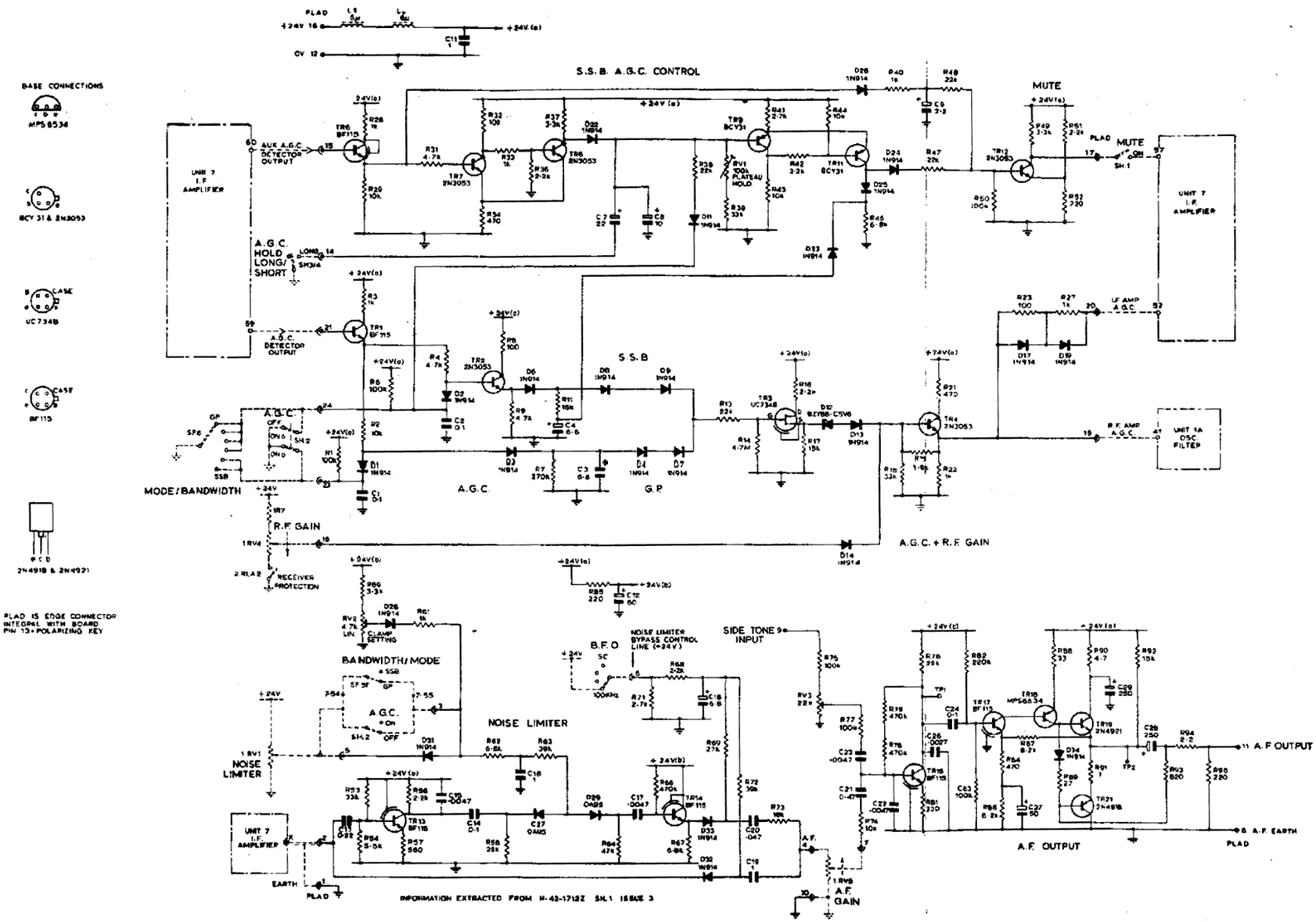
A.G.C. Noise Limiter & A.F. Board N-42-1712-01

Circuit Diagram (Unit 8)

Ref.	M.C.L. No.	Ref.	M.C.L. No.	Ref.	M.C.L. No.
C1	7	R23	265	R78	285
C2	7	R27	263	R79	266
C3	86	R28	263	R81	264
C4	86	R29	317	R82	326
C7	88	R31	262	R83	290
C8	89	R32	317	R84	331
C9	90	R33	263	R85	273
C11	71	R34	331	R86	313
C12	91	R36	286	R87	313
C13	39	R37	296	R88	260
C14	7	R38	285	R89	269
C15	92	R39	274	R90	249
C16	71	R40	263	R91	341
C17	92	R41	332	R92	295
C18	86	R42	286	R93	342
C19	71	R43	317	R94	343
C20	8	R44	317	R96	273
C21	12	R46	336		
C22	92	R47	285		
C23	2	R48	285	D1	651
C24	7	R49	296	D2	651
C26	9	R50	290	D3	651
C27	91	R51	286	D4	651
C28	95	R52	309	D6	651
C29	95	R53	333	D7	651
		R54	334	D8	651
		R56	286	D9	651
R1	290	R57	335	D11	651
R2	317	R58	285	D12	659
R3	263	R59	296	D13	651
R4	262	R61	263	D14	651
R6	290	R62	336	D17	651
R7	329	R63	337	D19	651
R8	265	R64	338	D22	651
R9	262	R66	266	D23	651
R11	295	R67	336	D24	651
R12	285	R68	286	D25	651
R13	285	R69	339	D26	651
R14	373	R71	332	D27	657
R16	286	R72	337	D28	651
R17	295	R73	340	D29	657
R18	274	R74	254	D31	651
R19	314	R75	312	D32	651
R21	331	R76	266	D33	651
R22	263	R77	290	D34	651

Cross Reference List for Unit 8 cont.

Ref.	M.C.L. No.
TR1	701
TR2	705
TR3	700
TR4	705
TR6	701
TR7	705
TR8	705
TR9	707
TR11	707
TR12	705
TR13	701
TR14	701
TR16	701
TR17	701
TR18	708
TR19	709
TR21	710
L1	500
L2	500
RV1	464
RV2	465
RV3	466

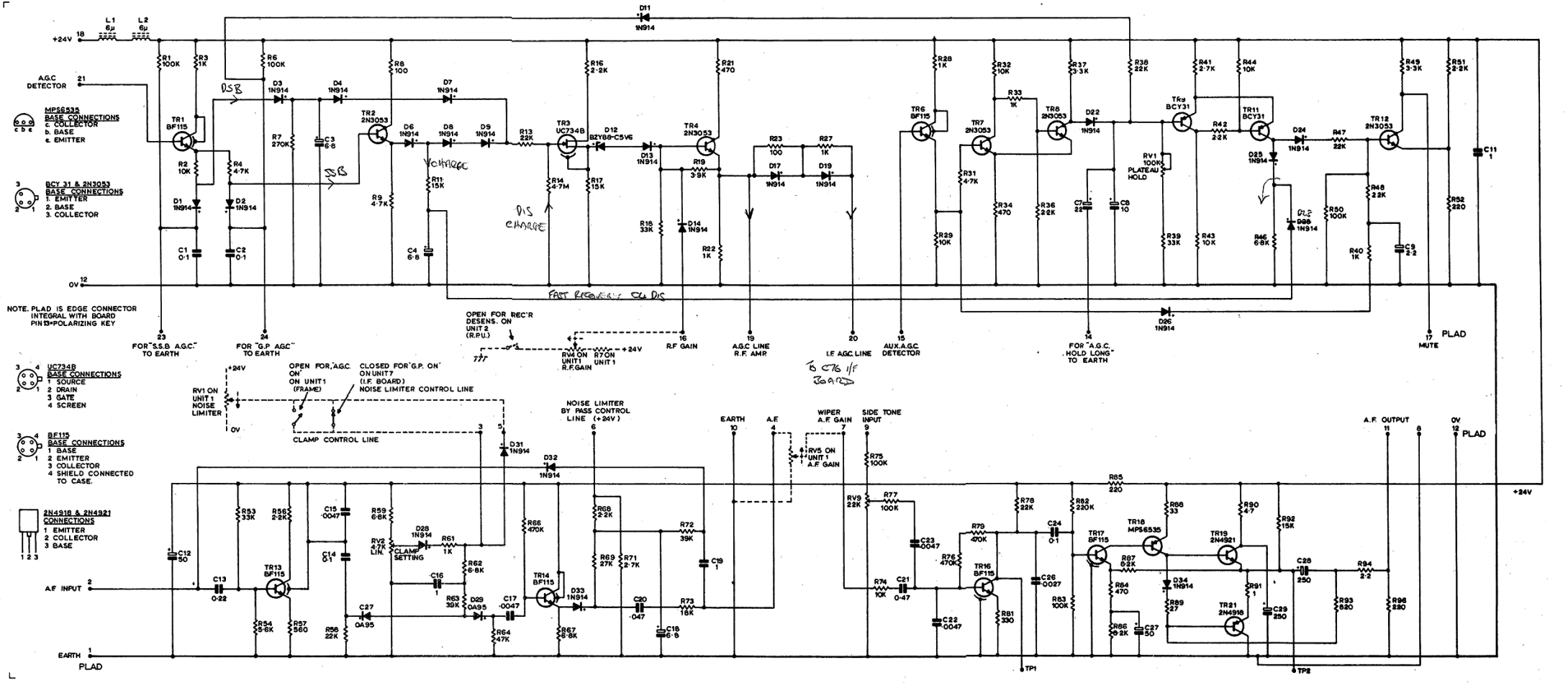


A.G.C., NOISE LIMITER AND A.F. BOARD N-42-1712-01
CIRCUIT DIAGRAM

UNIT 8

4.63

N/WD.7008/D Sh.1
ISSUE 3



N2050 G.P / S.S.B. RECEIVER

® UNIT 8 A.G.C. / NOISE LIMITER / A.F. BOARD
N-42-1712-01 CIRCUIT

N-42-1712 SH.1
ISSUE 1

4.63

Cross Reference List

for

Apollo Receiver

Frequency Generator & B.F.O. Board N-42-1711-01

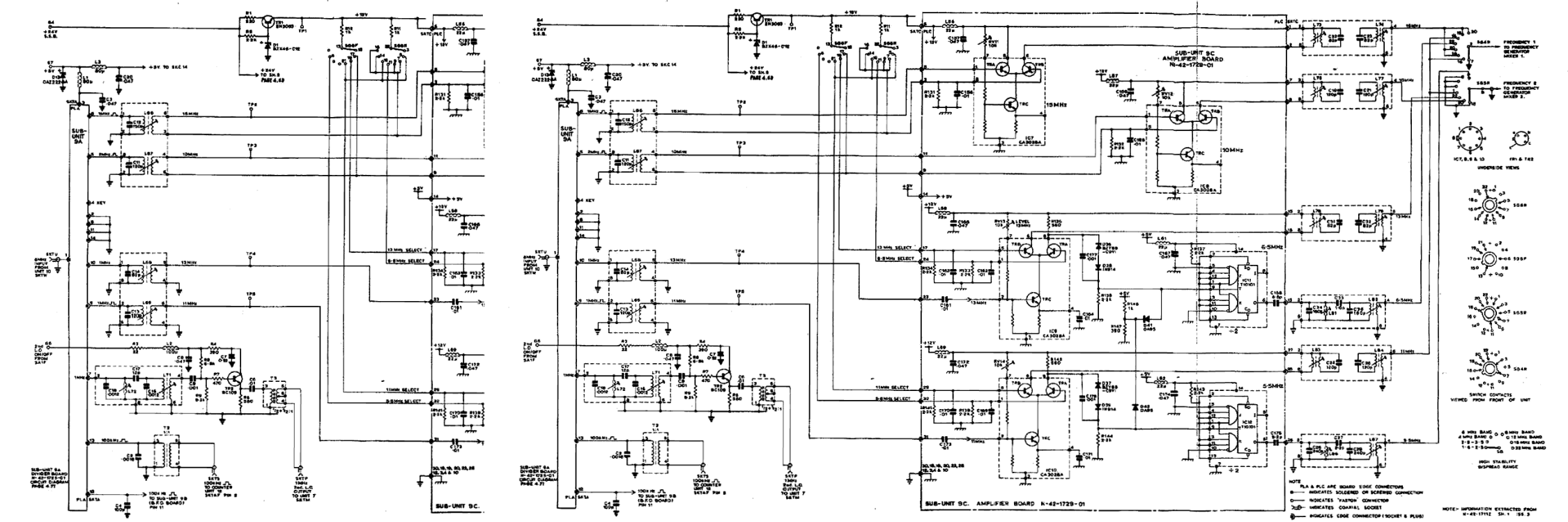
Circuit Diagram (Unit 9)

Ref.	M.C.L. No.	Ref.	M.C.L. No.	Ref.	M.C.L. No.
C1	42	C62	20	C124	119
C2	42	C63	110	C126	8
C3	8	C64	110	C127	116
C4	97	C65	20	C131	7
C6	51	C66	30	C132	71
C7	39	C67	20	C133	7
C8	8	C68	21	C134	7
C9	99	C69	21	C136	7
C11	100	C70	30	C137	121
C12	101	C71	30	C138	122
C13	100	C72	20	C139	7
C14	38	C73	45	C141	7
C16	102	C74	45	C142	7
C17	103	C75	30	C143	7
C18	102	C76	30	C144	7
C19	100	C77	20	C146	7
C20	8	C78	111	C147	7
C21	100	C79	111	C148	71
C22	38	C80	20	C149	71
C23	38	C81	30	C151	71
C24	100	C82	20	C156	51
C26	100	C83	108	C157	8
C27	104	C84	108	C158	51
C28	105	C85	20	C159	8
C29	105	C86	30	C161	51
C31	38	C87	20	C162	51
C32	38	C89	99	C163	51
C33	106	C90	51	C164	51
C34	107	C91	51	C166	8
C36	107	C92	99	C167	8
C37	99	C93	8	C168	123
C38	107	C94	99	C169	51
C39	51	C96	8	C170	51
C41	99	C97	99	C171	51
C44	51	C98	99	C172	8
C46	8	C103	99	C173	51
C47	8	C104	8	C174	8
C48	99	C105	8	C176	119
C49	8	C106	99	C177	121
C51	100	C107	8	C178	121
C52	21	C108	113	C181	104
C53	103	C111	114	R1	344
C54	103	C112	115	R2	304
C55	20	C113	82	R3	281
C56	30	C114	123	R4	345
C57	20	C115	116	R6	335
C58	109	C119	8	R7	291
C59	109	C121	117	R8	327
C60	20	C122	112	R9	346
C61	30	C123	118	R11	258
				R12	258
				R13	254

Cross Reference List for Unit 9 cont.

Ref.	M.C.L. No.	Ref.	M.C.L. No.	Ref.	M.C.L. No.
R14	346	R74	350	R137	304
R16	255	R76	345	R138	304
R17	335	R77	335	R139	304
R18	261	R78	291	R141	304
R19	309	R79	346	R142	335
R21	307	R80	327	R143	304
R22	349	R81	259	R144	304
R23	255	R82	307		
R24	350	R83	356		
R26	350	R84	291	RV1	459
R27	350	R86	261	RV2	460
R28	350	R87	307	RV3	460
R29	335	R88	307	RV4	461
R31	345	R94	281	RV6	460
R32	291	R95	304	RV7	460
R33	346	R96	309	RV8	459
R34	327	R97	353	RV11	462
R36	309	R98	257	RV12	462
R37	351	R99	353	RV13	462
R38	327	R101	306	RV14	462
R39	346	R104	357		
R41	352	R106	257		
R42	353	R107	358	L1	559
R43	261	R108	351	L2	504
R44	334	R109	357	L3	559
R45	354	R111	359	L6	500
R46	255	R112	351	L7	500
R47	279	R113	360	L8	562
R48	354	R114	254	L9	562
R49	258	R116	254	L11	558
R50	345	R117	346	L12	563
R52	258	R118	254	L13	563
R53	354	R119	329	L14	563
R54	255	R121	361	L16	564
R59	309	R122	255	L17	564
R61	351	R123	255	L18	564
R62	259	R124	263	L20	565
R63	255	R126	325	L21	565
R64	279	R127	257	L22	565
R66	309	R128	257	L23	566
R67	349	R131	304	L24	566
R68	255	R132	304	L25	566
R69	349	R133	304	L27	567
R71	350	R134	304	L28	567
R72	350	R136	335	L29	567
R73	350				

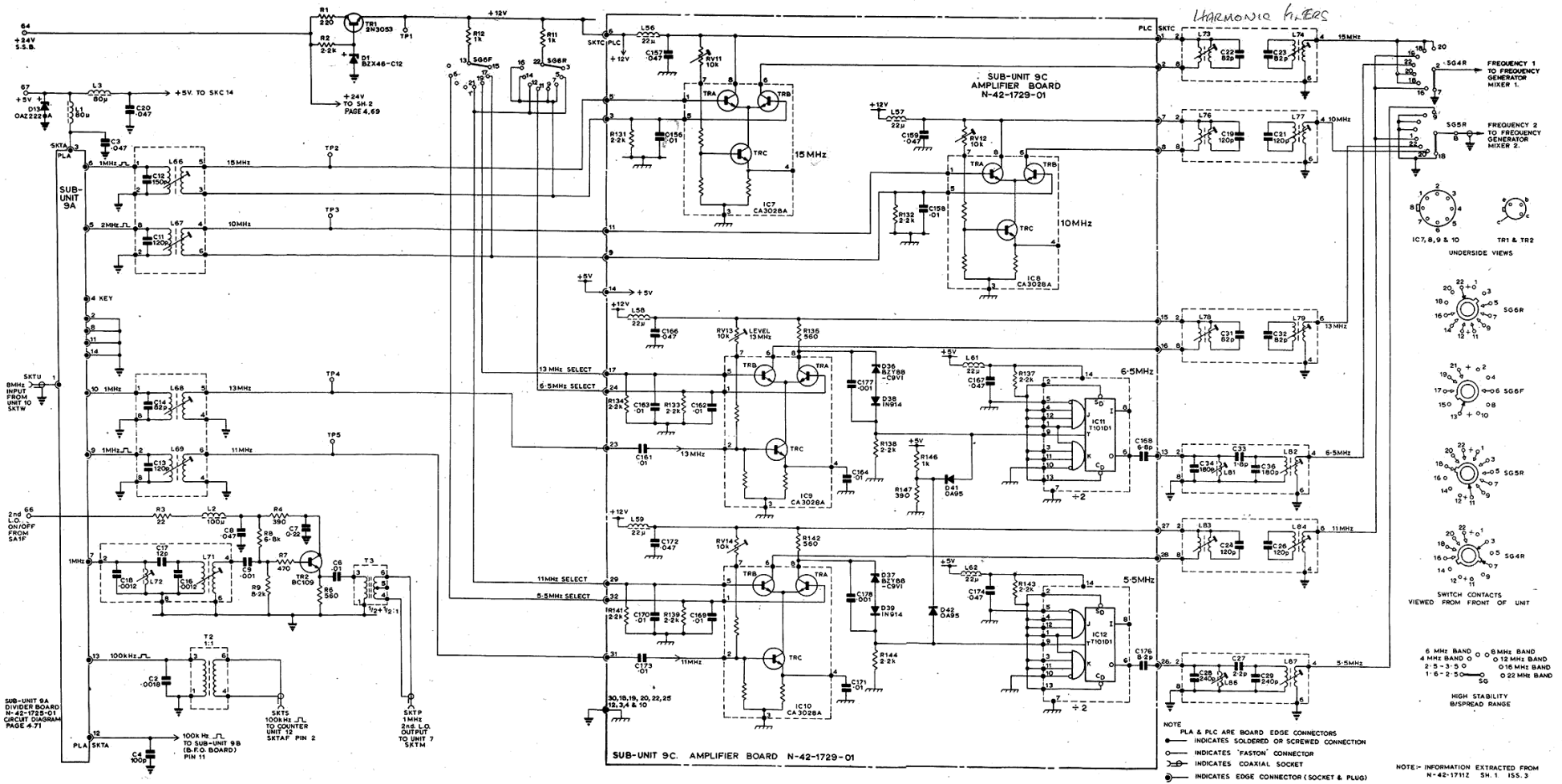
Ref.	M.C.L. No.	Ref.	M.C.L. No.	Ref.	M.C.L. No.
L31	568	D28	651	SKTS	896
L32	568	D29	651	SKTT	896
L33	568	D30	651	SKTU	896
L35	569	D36	663		
L36	569	D37	663		
L37	569	D38	651	SG1	966
L38	504	D39	651	SG2	967
L39	562	D41	657	SG3	968
L41	500	D42	657	SG4	969
L42	500			SG5	970
L43	559			SG6	971
L44	559				
L47	562				
L49	571	TR1	705	T1	1055
L52	572	TR2	711	T2	1055
L53	557	TR3	704	T3	1051
L56	562	TR4	704	T4	1051
L57	562	TR6	704	T6	1052
L58	562	TR7	701	T7	1051
L59	562	TR8	704	T8	1052
L61	562	TR9	704	T9	1053
L62	562	TR11	701		
L66	573	TR12	701		
L67	573	TR13	704		
L68	574	TR17	704		
L69	574	TR18	704		
L71	575	TR19	704		
L72	575	TR21	701		
L73	576	TR22	701		
L74	576	TR23	705		
L76	577				
L77	577				
L78	578	IC1	750		
L79	578	IC2	750		
L81	579	IC3	750		
L82	579	IC4	751		
L83	580	IC5	751		
L84	580	IC7	752		
L86	581	IC8	752		
L87	581	IC9	752		
		IC10	752		
		IC11	750		
D1	660	IC12	750		
D2 - D5	656				
D7	652				
D9 - D12	656	SKTA	886		
D13	661	SKTB	887		
D19	651	SKTC	888		
D21	651	SKTN	896		
D24	662	SKTP	896		
D26	662	SKTQ	896		
D27	651	SKTR	896		



FREQUENCY GENERATOR AND B.F.O. UNIT N-42-1711-01
CIRCUIT DIAGRAM

UNITS 9 AND 9C

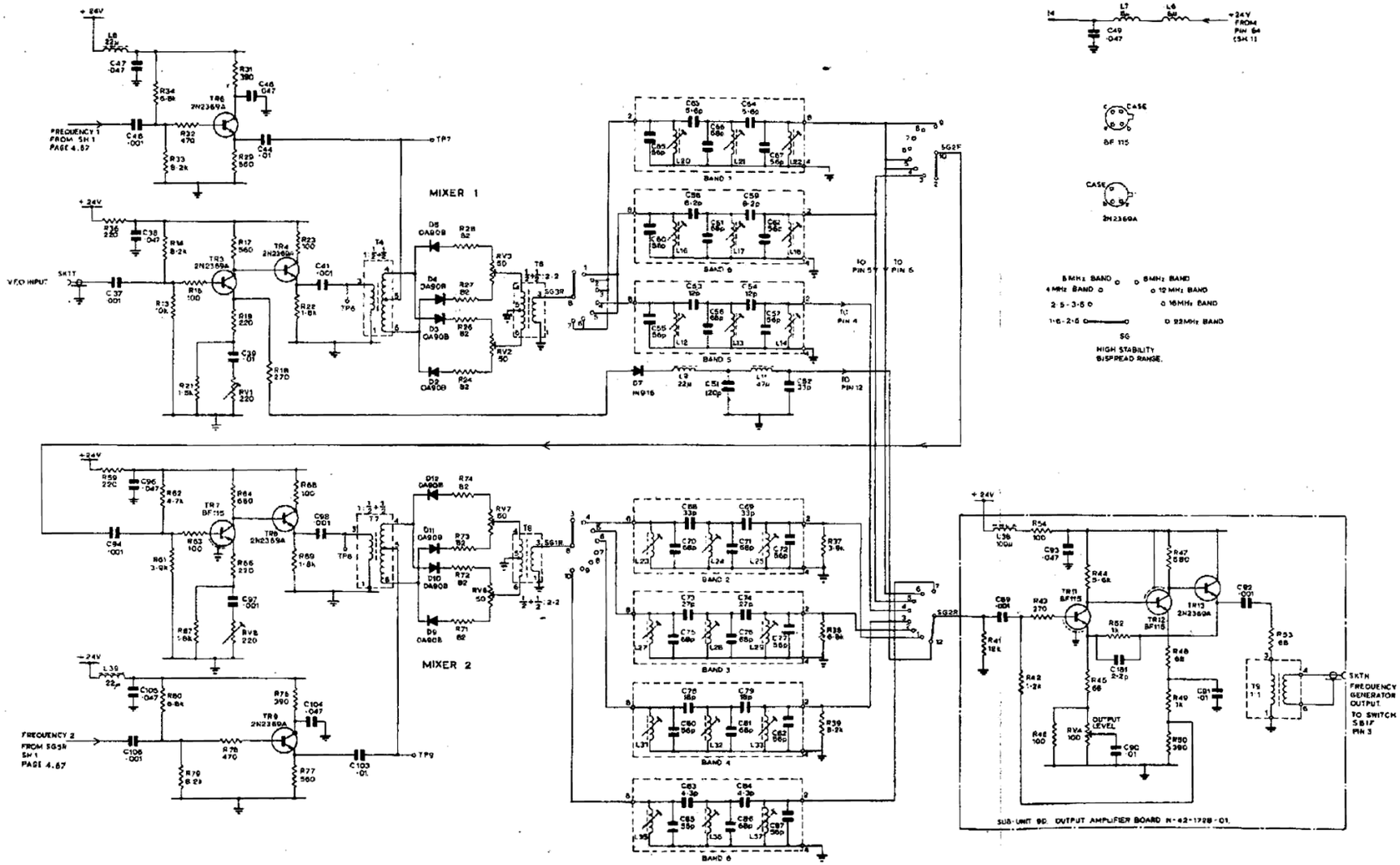
N/WD.7009/D Sh.1
ISSUE 1



FREQUENCY GENERATOR AND B.F.O. UNIT N-42-1711-01
CIRCUIT DIAGRAM

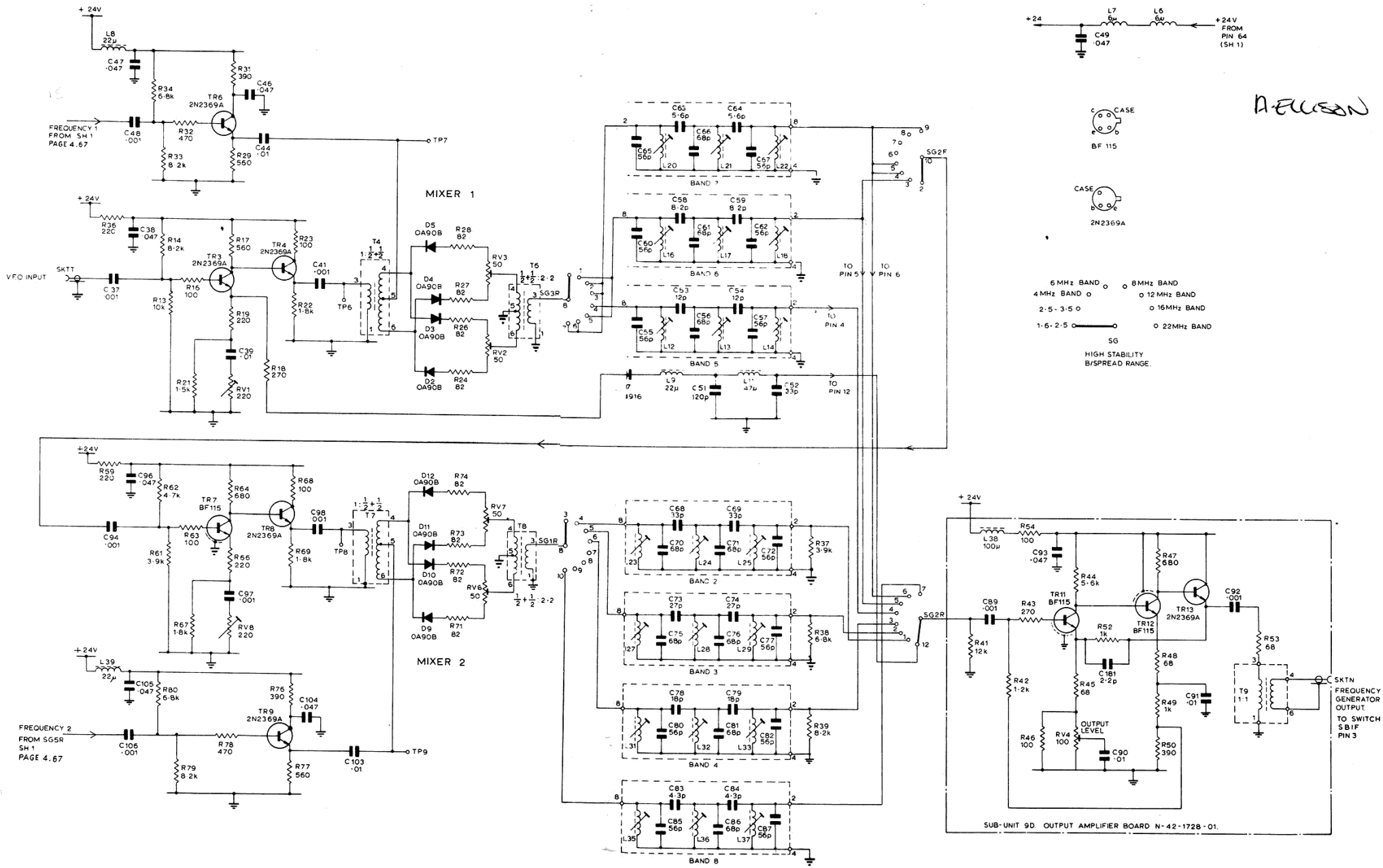
UNITS 9 AND 9C

N/WD.7009/D Sh.1
ISSUE 1



FREQUENCY GENERATOR AND B.F.O. UNIT N-42-1711-01
CIRCUIT DIAGRAM

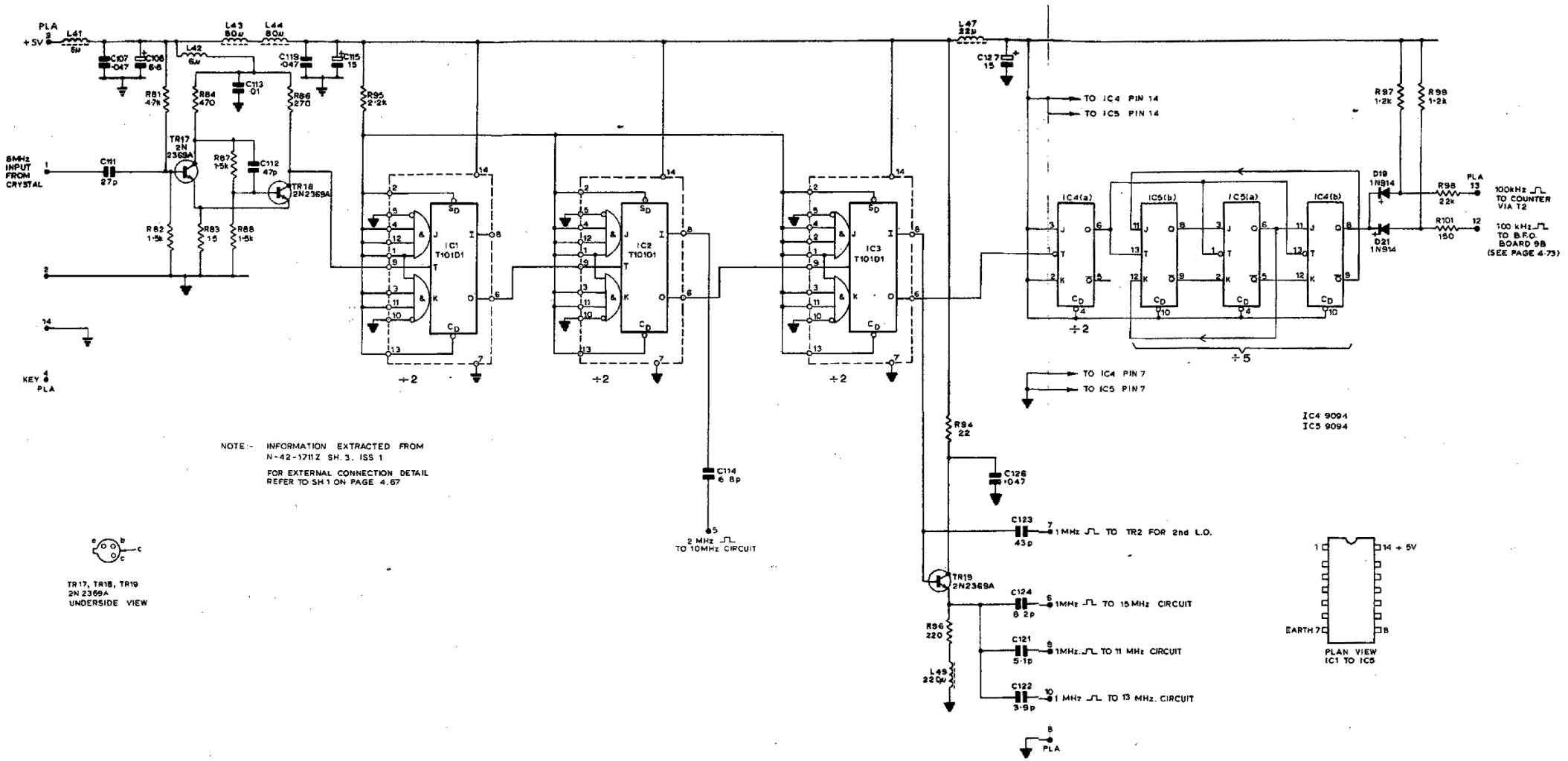
UNITS 9 AND 9D



FREQUENCY GENERATOR AND B.F.O. UNIT N-42-1711-01
CIRCUIT DIAGRAM

UNITS 9 AND 9D

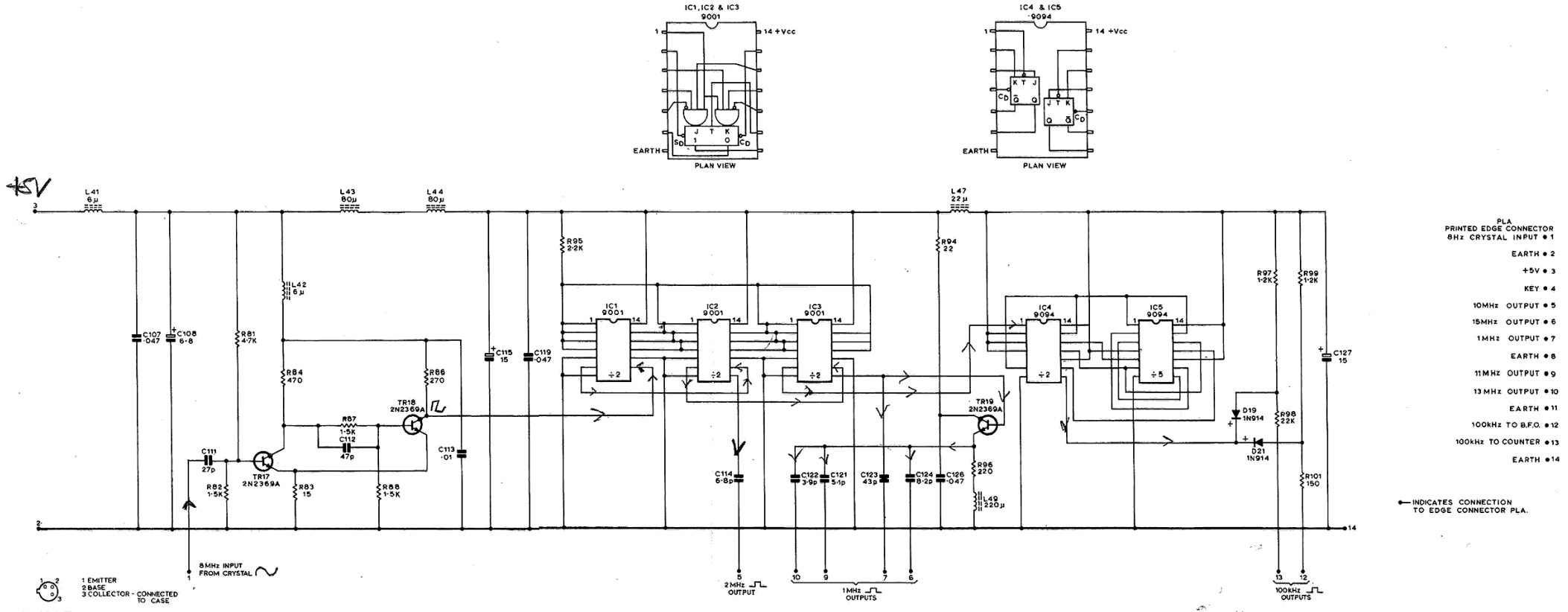
N/WD.7009/D Sh.2
ISSUE 1



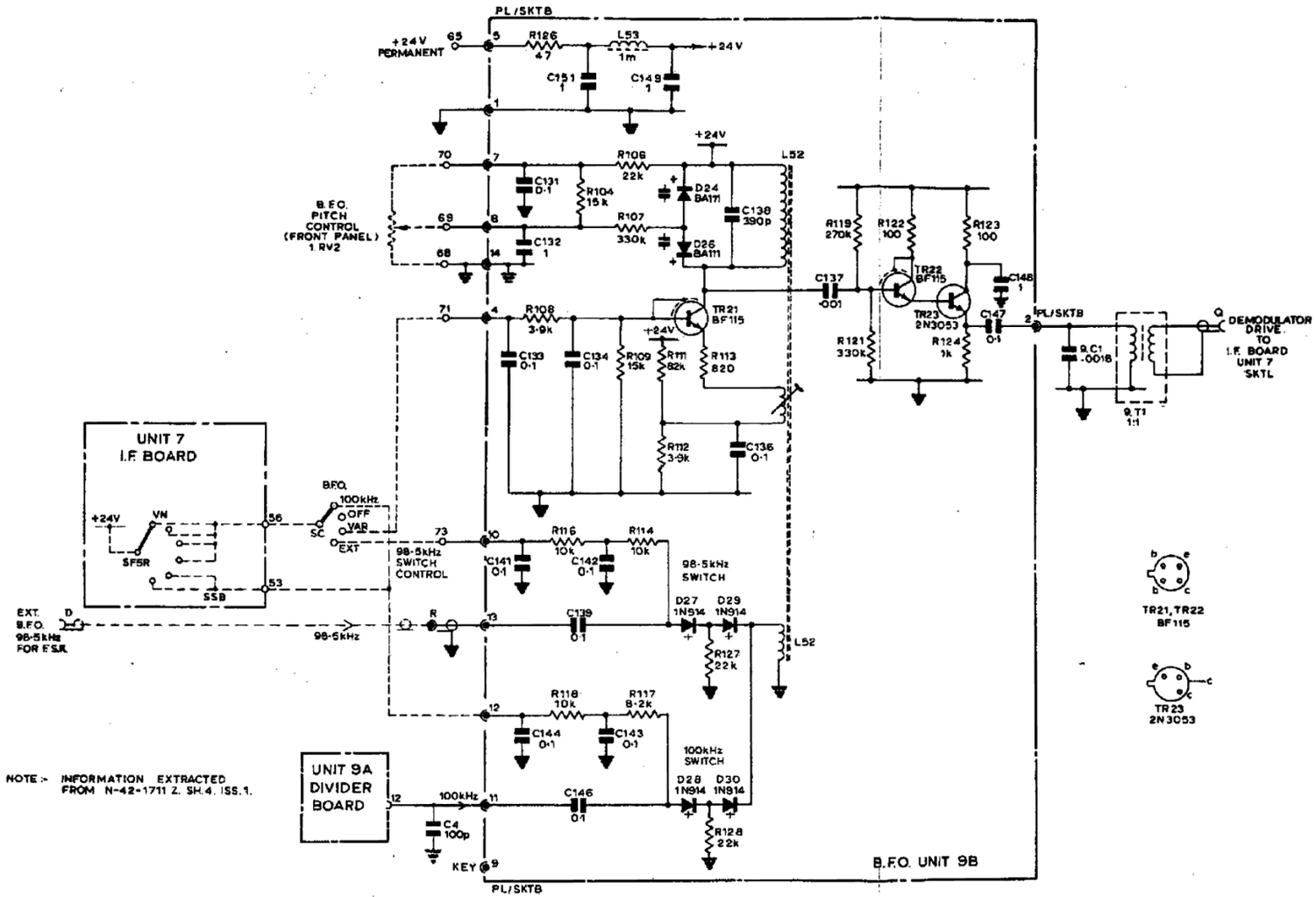
FREQUENCY GENERATOR AND B.F.O. UNIT N-42-1711-01
DIVIDER BOARD N-42-1725-01
CIRCUIT DIAGRAM

UNIT 9A

N/WD.7009/D Sh.3
ISSUE 1



DIVIDER SUB-BOARD N-42-1725-01 (SUB-UNIT 9A)

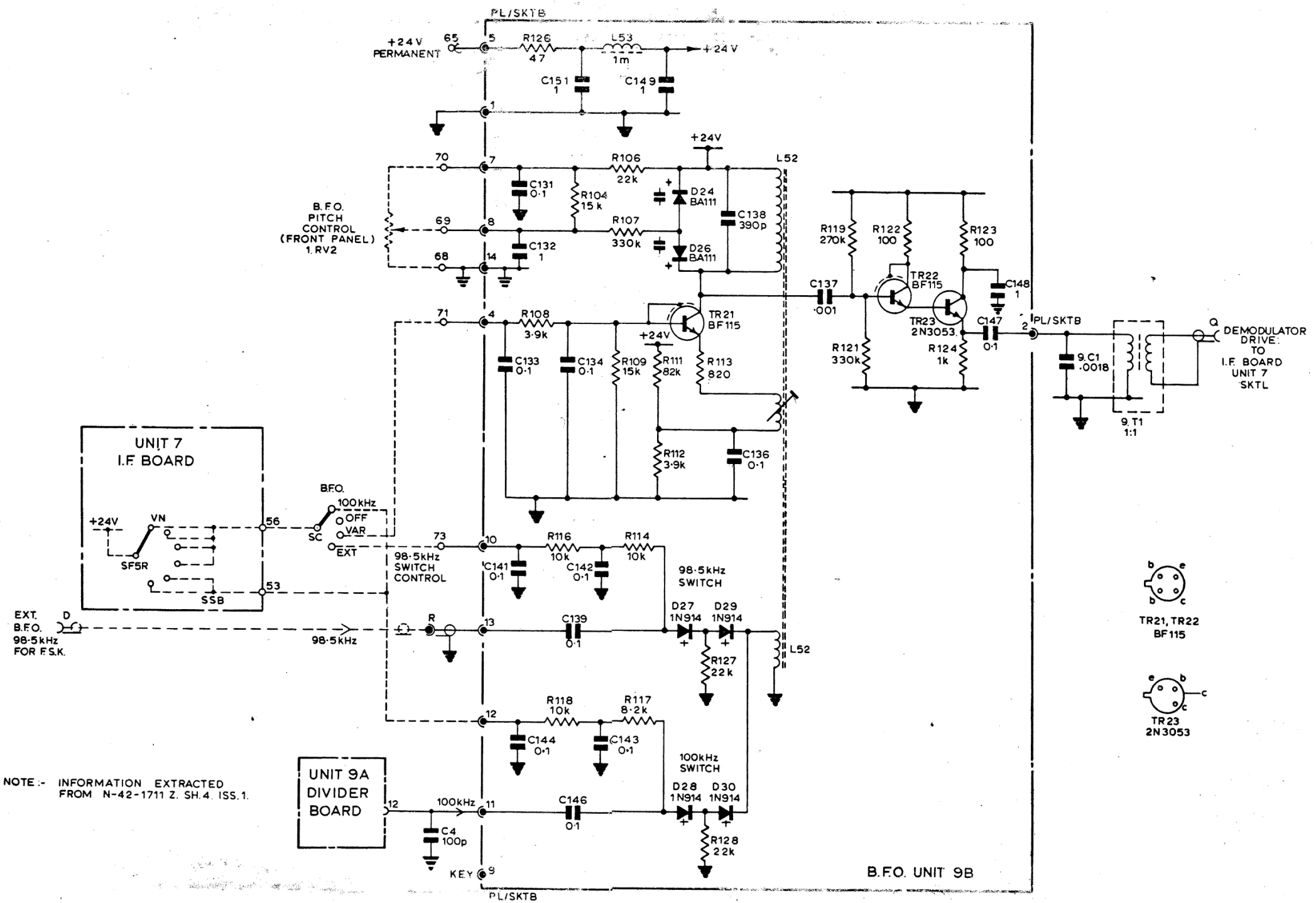


FREQUENCY GENERATOR AND B.F.O. UNIT N-42-1711-01
B.F.O. BOARD N-42-1724-01
CIRCUIT DIAGRAM

UNIT 9B

4.73

N/WD.7009/C. Sh.4
ISSUE 1


PL/SKTB
+24V PERMANENT
65
5
R126 47
L53 1m
+24V
C151 1
C149 1
1
+24V
70
7
R106 22k
L52
C131 0·1
R104 15k
D24 BA111
C138 390p
B.F.O. PITCH CONTROL (FRONT PANEL) 1.RV2
69
8
R107 330k
D26 BA111
68
14
C132 1
R119 270k
R122 100
R123 100
TR22 BF115
C148 1
C137 ·001
TR23 2N3053
C147 0·1
2
PL/SKTB
Q
DEMODULATOR DRIVE TO I.F. BOARD UNIT 7 SKTL
71
4
R108 3·9k
TR21 BF115
+24V
C133 0·1
C134 0·1
R109 15k
R111 82k
R113 820
R121 330k
R124 1k
9.C1 ·0018
9.T1 1:1
R112 3·9k
C136 0·1
UNIT 7 I.F. BOARD
+24V
VN
56
SC
B.F.O.
100kHz
OFF
VAR
EXT
SF5R
SSB
53
73
98·5kHz SWITCH CONTROL
10
R116 10k
R114 10k
C141 0·1
C142 0·1
98·5kHz SWITCH
EXT. B.F.O. 98·5kHz FOR F.S.K.
D
R
98·5kHz
13
C139 0·1
D27 1N914
D29 1N914
R127 22k
L52
12
R118 10k
R117 8·2k
C144 0·1
C143 0·1
100kHz SWITCH
UNIT 9A DIVIDER BOARD
12
100kHz
11
C146 0·1
D28 1N914
D30 1N914
C4 100p
R128 22k
KEY
9
PL/SKTB
B.F.O. UNIT 9B
TR21, TR22 BF115
TR23 2N3053
NOTE :- INFORMATION EXTRACTED FROM N-42-1711 Z. SH.4. ISS.1.

Cross Reference List

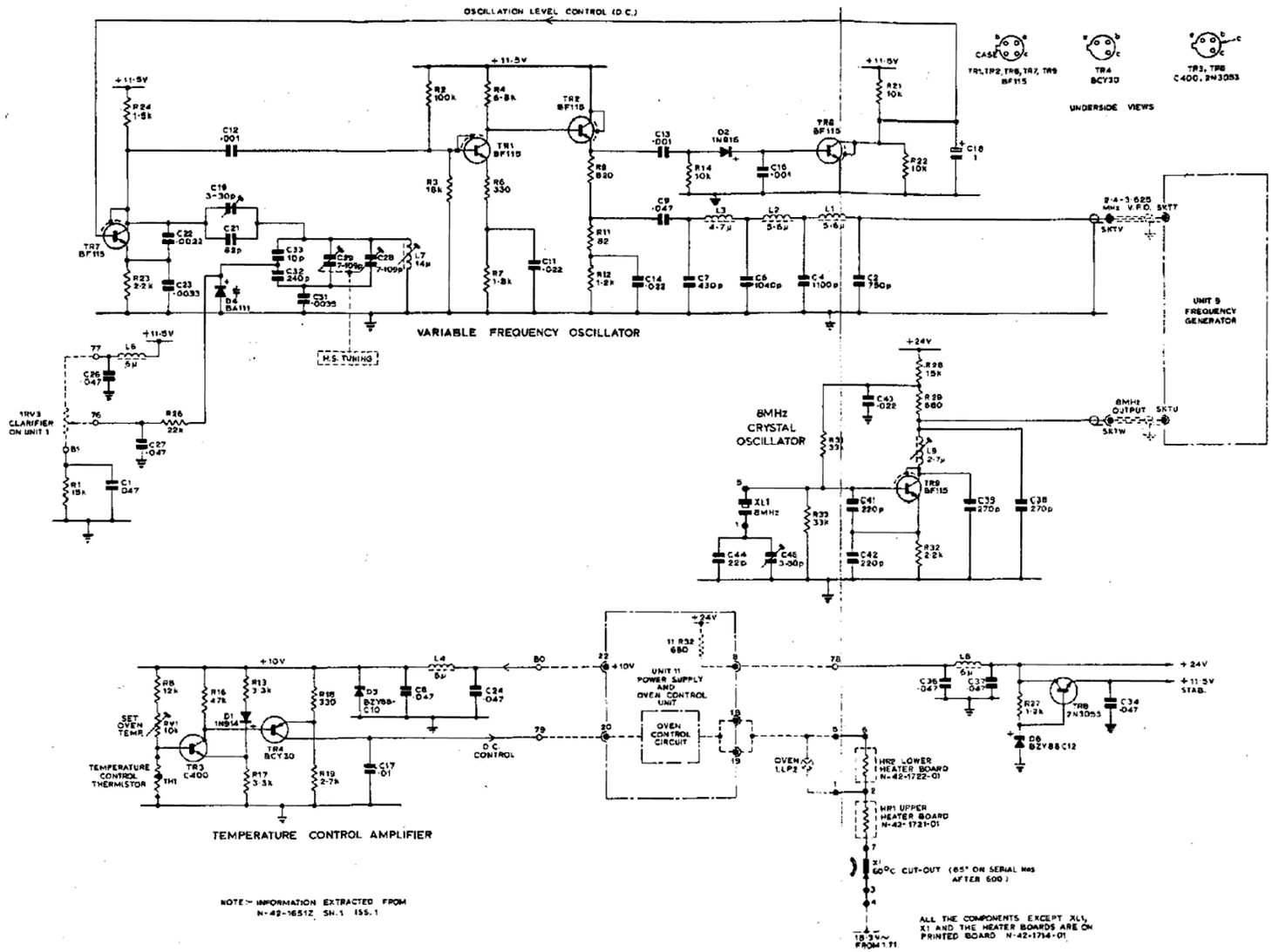
for

Apollo Receiver

Oven Unit N-42-1651-01

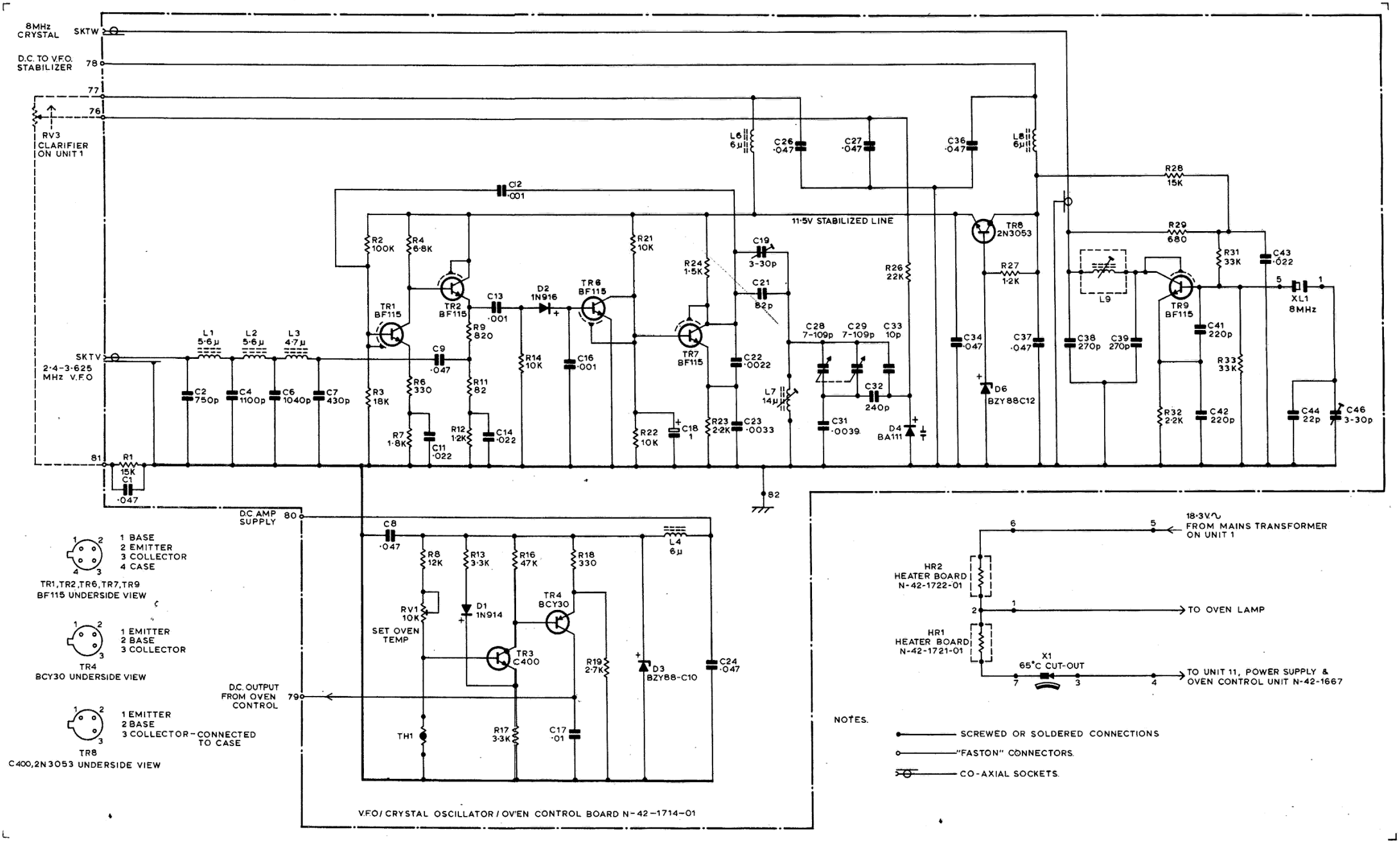
Circuit Diagram (Unit 10)

Ref.	MCL No.	Ref.	MCL No.	Ref.	MCL No.
C1	8	R16	338	TH1	1111
C2	124	R17	296		
C4	125	R18	264	SKTV	896
C6	126	R19	332	SKTW	896
C7	35	R21	317		
C8	8	R22	317		
C9	8	R23	286	Heater boards:	
C11	85	R24	321		
C12	127	R26	285	HR1	1109
C13	127	R27	287	HR2	1110
C14	85	R28	295		
C16	127	R29	311		
C17	82	R31	274		
C18	37	R32	286	* X1 is MCL No.1117	
C19	19	R33	274	on S/Nos. after 600	
C21	128				
C22	129				
C23	130	RV1	458		
C24	8				
C26	8				
C27	8	L1	582		
C28)	131	L2	582		
C29)		L3	583		
C31	132	L4	500		
C32	133	L6	500		
C33	79	L7	584		
C34	8	L8	500		
C35	8	L9	585		
C37	8				
C38	11				
C39	11	D1	651		
C41	68	D2	652		
C42	68	D3	665		
C43	85	D4	662		
C44	135	D6	666		
C46	19				
		TR1	701		
R1	295	TR2	701		
R2	290	TR3	712		
R3	362	TR4	713		
R4	336	TR6	701		
R6	264	TR7	701		
R7	315	TR8	705		
R8	275	TR9	701		
R9	342				
R11	276				
R12	287	XL1	1107		
R13	296	* X1	1112		
R14	317				



OVEN UNIT N-42-1651-01
CIRCUIT DIAGRAM

UNIT 10

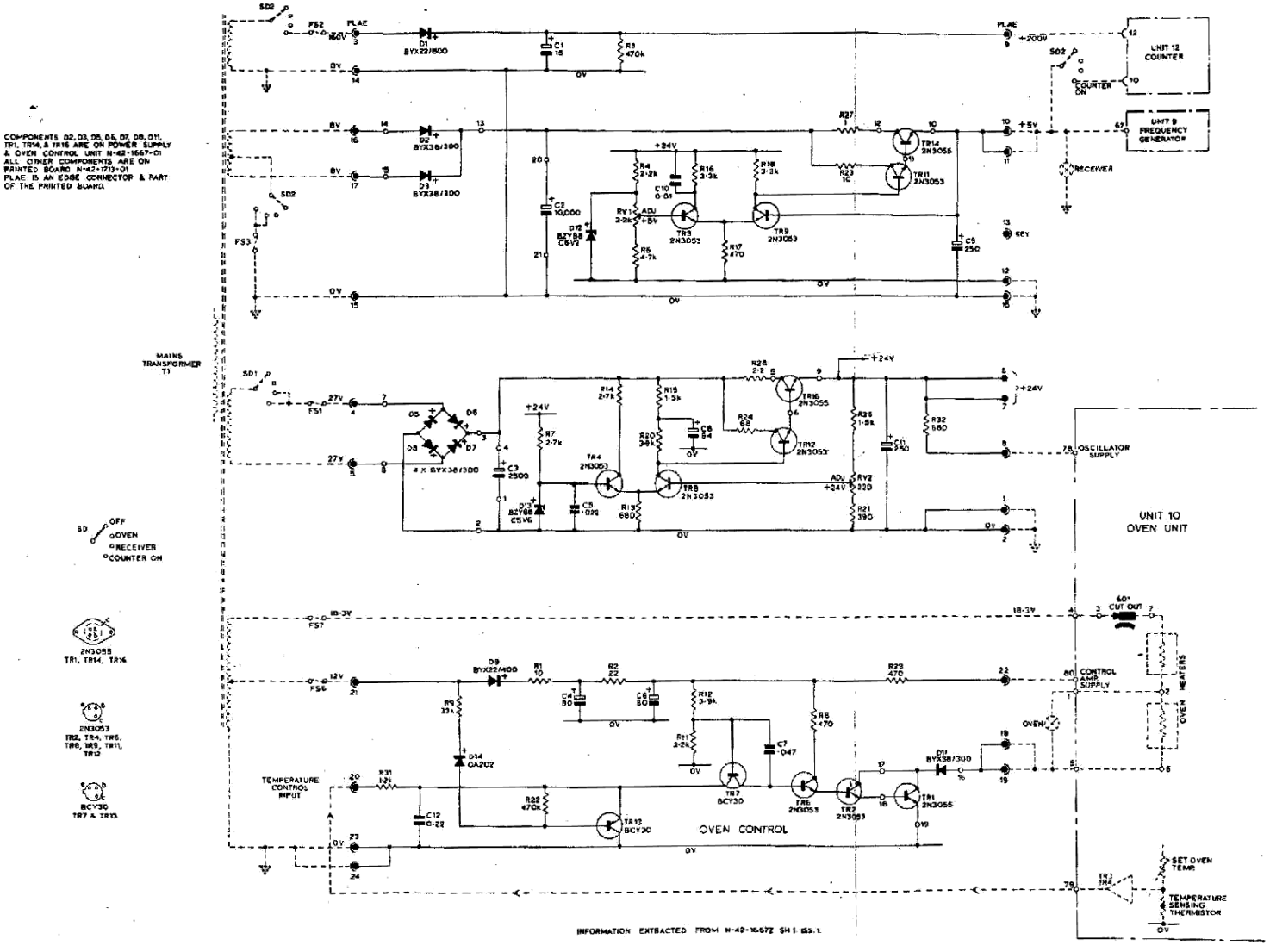

8MHz CRYSTAL
SKTW
D.C. TO V.F.O. STABILIZER
78
77
76
RV3 CLARIFIER ON UNIT 1
L6 6µ
C26 ·047
C27 ·047
C36 ·047
L8 6µ
R28 15K
C12 ·001
11·5V STABILIZED LINE
TR8 2N3053
R29 680
R31 33K
C43 ·022
R2 100K
R4 6·8K
R21 10K
C19 3-30p
R24 1·5K
R26 22K
R27 1·2K
L9
TR9 BF115
XL1 8MHz
TR1 BF115
TR2 BF115
C13 ·001
D2 1N916
TR6 BF115
C21 82p
TR7 BF115
L1 5·6µ
L2 5·6µ
L3 4·7µ
SKTV
2·4-3·625 MHz V.F.O
C9 ·047
R9 820
R14 10K
C16 ·001
C22 ·0022
C28 7-109p
C29 7-109p
C33 10p
C34 ·047
C37 ·047
C38 270p
C39 270p
C41 220p
R33 33K
C2 750p
C4 1100p
C6 1040p
C7 430p
R3 18K
R6 330
R11 82
L7 14µ
C32 240p
D6 BZY88C12
R32 2·2K
C42 220p
C44 22p
C46 3-30p
R7 1·8K
C11 ·022
R12 1·2K
C14 ·022
R22 10K
C18 1
R23 2·2K
C23 ·0033
C31 ·0039
D4 BA111
81
R1 15K
C1 ·047
82
D.C. AMP SUPPLY
80
C8 ·047
L4 6µ
R8 12K
R13 3·3K
R16 47K
R18 330
RV1 10K
SET OVEN TEMP
D1 1N914
TR4 BCY30
TR3 C400
R19 2·7K
D3 BZY88-C10
C24 ·047
D.C. OUTPUT FROM OVEN CONTROL
79
TH1
R17 3·3K
C17 ·01
V.F.O/CRYSTAL OSCILLATOR/OVEN CONTROL BOARD N-42-1714-01
18·3V~ FROM MAINS TRANSFORMER ON UNIT 1
6
5
HR2 HEATER BOARD N-42-1722-01
2
1
TO OVEN LAMP
HR1 HEATER BOARD N-42-1721-01
X1 65°C CUT-OUT
7
3
4
TO UNIT 11, POWER SUPPLY & OVEN CONTROL UNIT N-42-1667
1 BASE
2 EMITTER
3 COLLECTOR
4 CASE
TR1, TR2, TR6, TR7, TR9 BF115 UNDERSIDE VIEW
1 EMITTER
2 BASE
3 COLLECTOR
TR4 BCY30 UNDERSIDE VIEW
1 EMITTER
2 BASE
3 COLLECTOR - CONNECTED TO CASE
TR8 C400, 2N3053 UNDERSIDE VIEW
NOTES.
SCREWED OR SOLDERED CONNECTIONS
"FASTON" CONNECTORS.
CO-AXIAL SOCKETS.

Cross Reference List

for

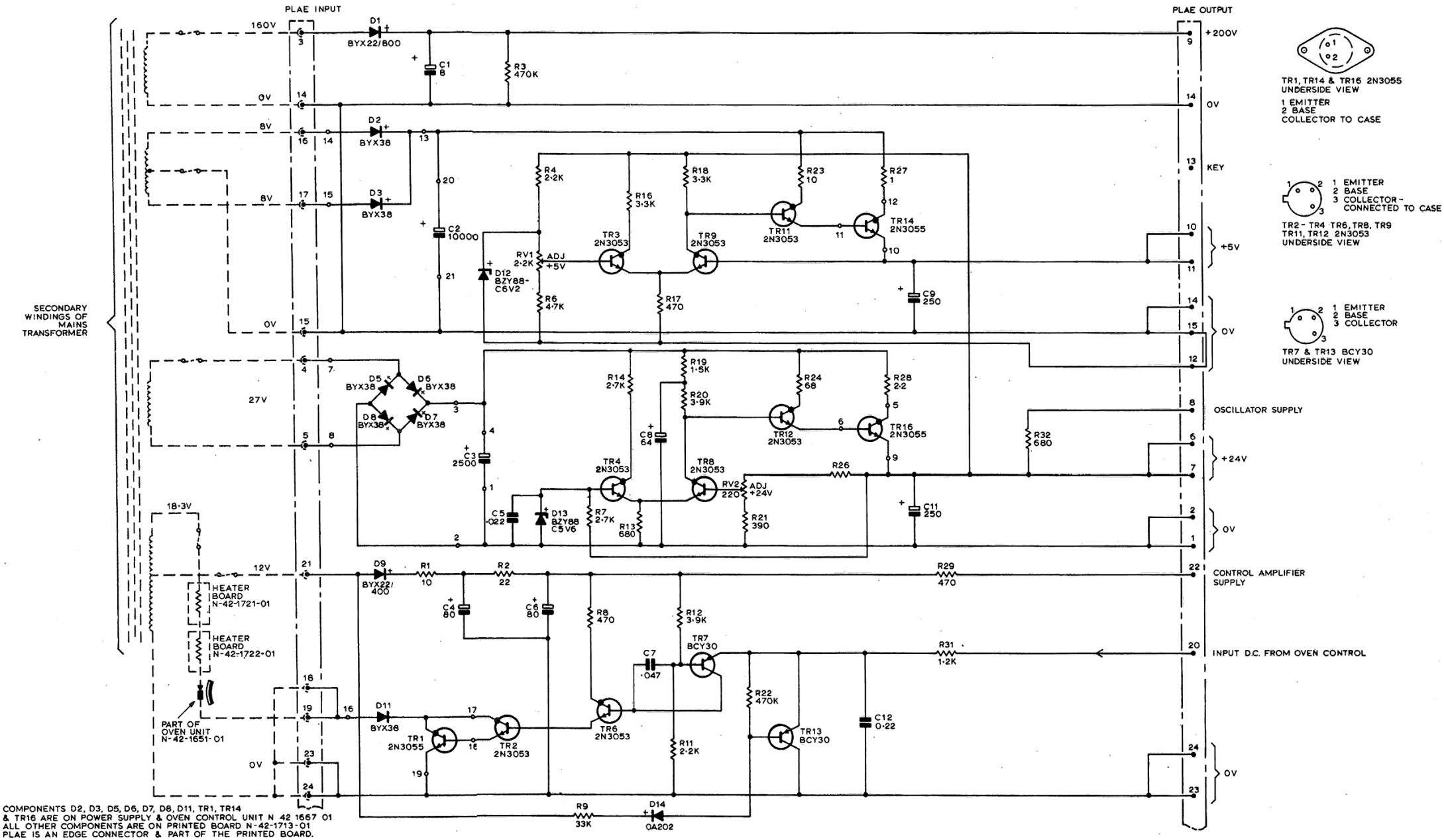
Apollo Receiver
Power Supply & Oven Control Unit N-42-1667-01
Circuit Diagram (Unit 11)

Ref.	M.C.L. No.	Ref.	M.C.L. No.
C1	136	D12	670
C2	137	D13	659
C3	138	D14	658
C4	139		
C5	85		
C6	139	TR1	714
C7	8	TR2	705
C8	141	TR3	705
C9	142	TR4	705
C10	143	TR6	705
C11	95	TR7	713
C12	39	TR8	705
		TR9	705
R1	271	TR11	705
R2	252	TR12	705
R3	266	TR13	713
R4	286	TR14	714
R6	262	TR16	714
R7	332		
R8	331		
R9	274	RV1	467
R11	286	RV2	468
R12	314		
R13	311		
R14	332		
R16	296		
R17	331		
R18	296		
R19	321		
R20	314		
R21	277		
R22	266		
R23	369		
R24	370		
R26	321		
R27	371		
R28	372		
R29	331		
R31	287		
R32	311		
D1	667		
D2	668		
D3	668		
D5	668		
D6	668		
D7	668		
D8	668		
D9	669		
D11	668		



POWER SUPPLY AND OVEN CONTROL UNIT N-42-1667-0
CIRCUIT DIAGRAM

UNIT 1



COMPONENTS D2, D3, D5, D6, D7, D8, D11, TR1, TR14 & TR16 ARE ON POWER SUPPLY & OVEN CONTROL UNIT N 42 1667 01 ALL OTHER COMPONENTS ARE ON PRINTED BOARD N-42-1713-01 PLAE IS AN EDGE CONNECTOR & PART OF THE PRINTED BOARD.

N-42-1667Z SH.1
ISSUE 1

N2050 G.P./S.S.B. RECEIVER.

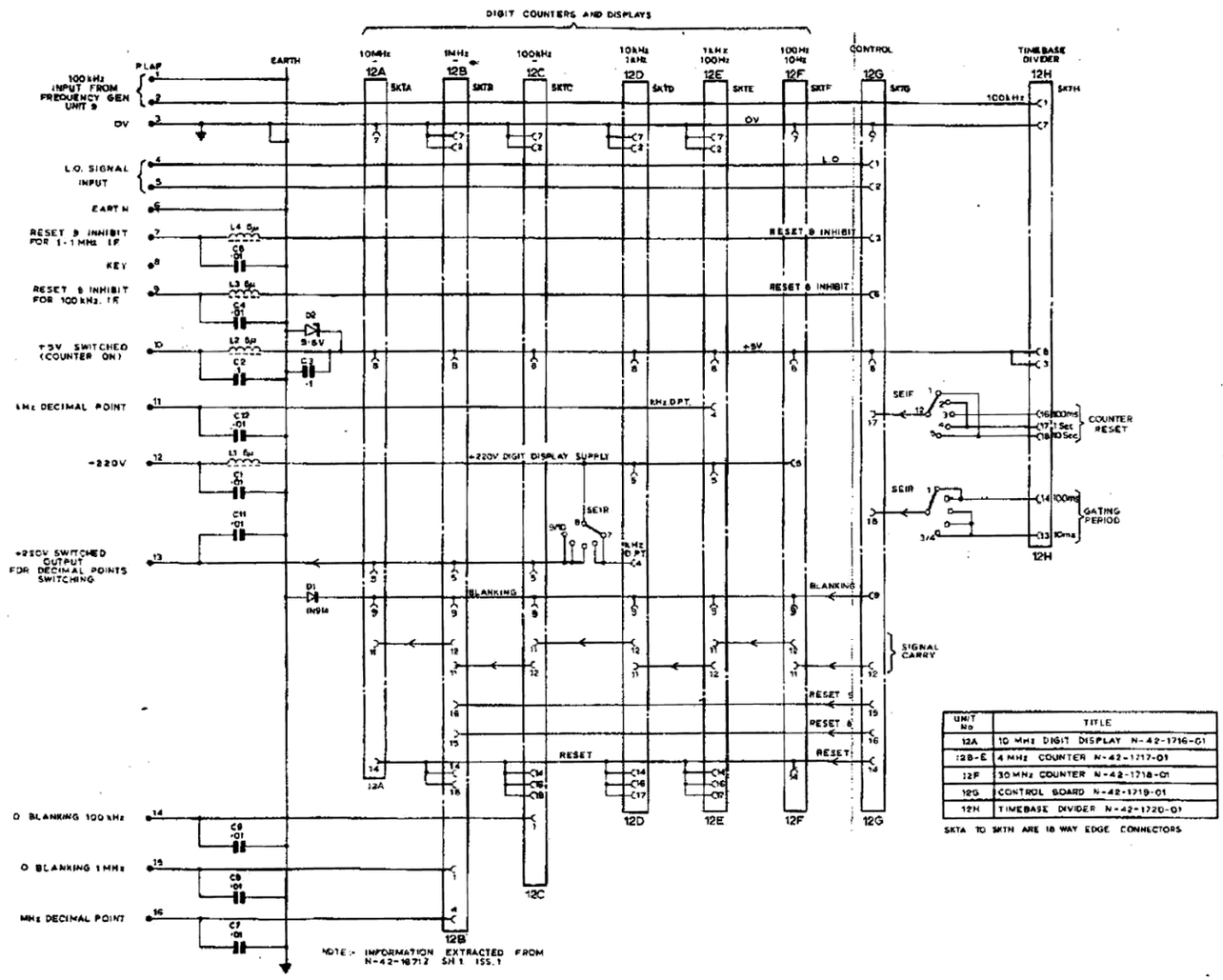
UNIT 11 POWER SUPPLY & OVEN CONTROL UNIT
N-42-1667-01 CIRCUIT.

Cross Reference List

for

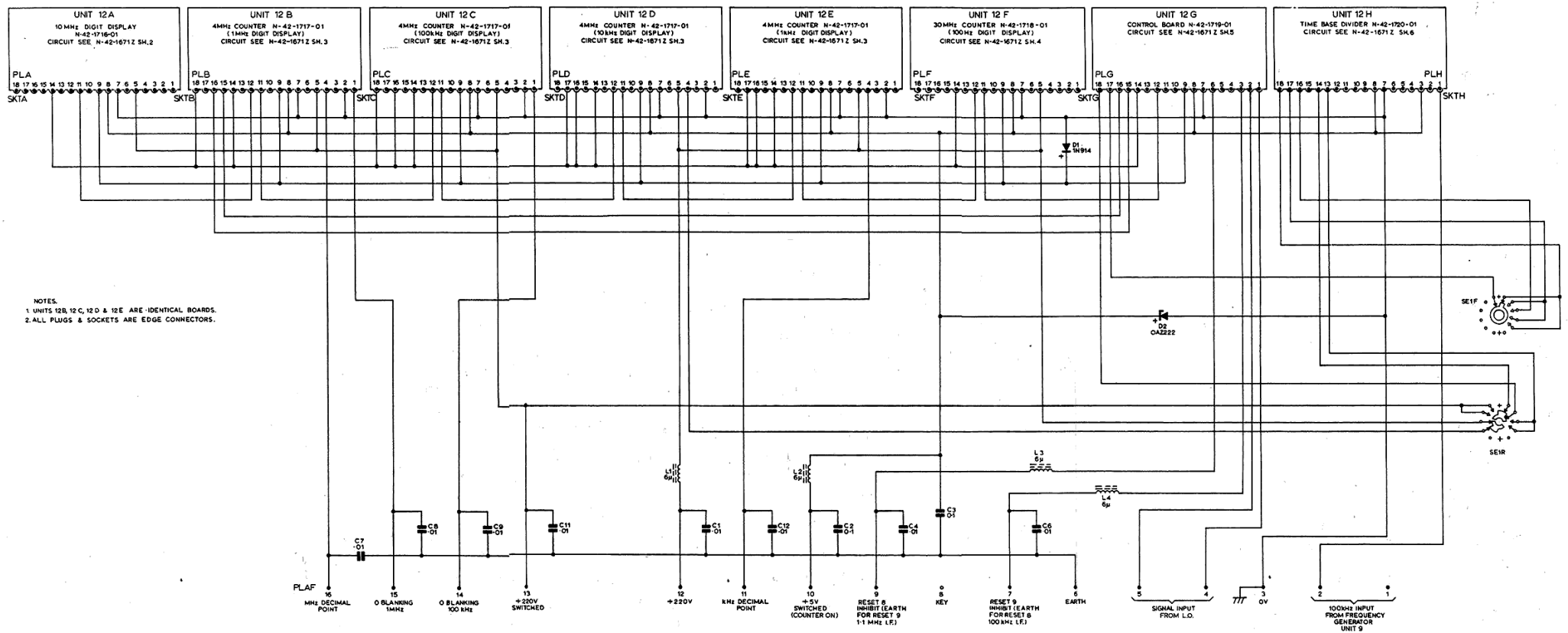
Apollo Receiver
Counter Unit N-42-1671-01
Circuit Diagram (Unit 12)

Ref.	M.C.L. No.
C1	144
C2	7
C3	7
C4	82
C6	82
C7	144
C8	82
C9	82
C11	144
C12	144
L1	500
L2	586
L3	500
L4	500
D1	651
D2	661
SKTA	889
SKTB	890
SKTC	890
SKTD	890
SKTE	890
SKTF	891
SKTG	892
SKTH	893
SE1	969



UNIT No	TITLE
12A	10 MHz DIGIT DISPLAY N-42-1716-01
12B-E	4 MHz COUNTER N-42-1717-01
12F	30 MHz COUNTER N-42-1718-01
12G	CONTROL BOARD N-42-1719-01
12H	TIMEBASE DIVIDER N-42-1720-01

SK1A TO SK1H ARE 18 WAY EDGE CONNECTORS



NOTES.
1. UNITS 12B, 12C, 12D & 12E ARE IDENTICAL BOARDS.
2. ALL PLUGS & SOCKETS ARE EDGE CONNECTORS.

UNIT 12 INTERCONNECTION BOARD N-42-1715-01

N2050 G.P./S.S.B. RECEIVER

UNIT 12, COUNTER UNIT N-42-1671-01 CIRCUIT ⑫

N-42-1671 Z SH.1
ISSUE 1

4.79

Cross Reference List

for

Apollo Receiver

10MHz Digit Display Board N-42-1716-01

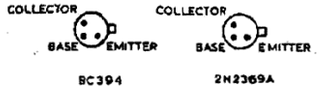
Circuit Diagram (Unit 12A)

Ref.	M.C.L. No.
C18	7
R6	274
R7	317
R8	317
R9	315
R11	286
R12	262
R13	296
D8	651
D9	651
D11	651
D12	651
D13	651
D14	651
D16	651
TR6	716
TR7	716
TR8	704
TR9	704
IC6	754
IC7	754
V1	800

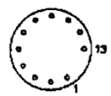
10 MHz COUNTER TRUTH TABLE

		A	B	DECODING	
RESET	0	0	1		
	1	0	0		
	2	1	0	A	$\overline{B}$
	3	1	1	A	B

TRANSISTOR BASES



BC394 2N2369A

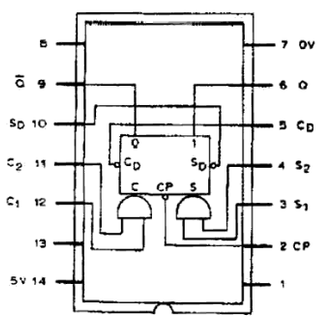


UNDERSIDE VIEW OF V1 BASE

9945 TRUTH TABLE

CLOCKED ENTRY					
INPUTS				OUTPUTS	
tn				tn+1	
3	4	11	12	6	9
S_1	S_2	C_2	C_1	Q	$\overline{Q}$
0	X	0	X	NC	NC
0	X	X	0	NC	NC
X	0	0	X	NC	NC
X	0	X	0	NC	NC
0	X	1	1	0	1
X	0	1	1	0	1
1	1	0	X	1	0
1	1	X	0	1	0
1	1	1	1	UNDETER-MINED	

DIRECT ENTRY			
INPUTS		OUTPUTS	
5	10	6	9
C_D	S_D	Q	$\overline{Q}$
1	1	NC	NC
1	0	1	0
0	1	0	1
0	0	1	1



9945

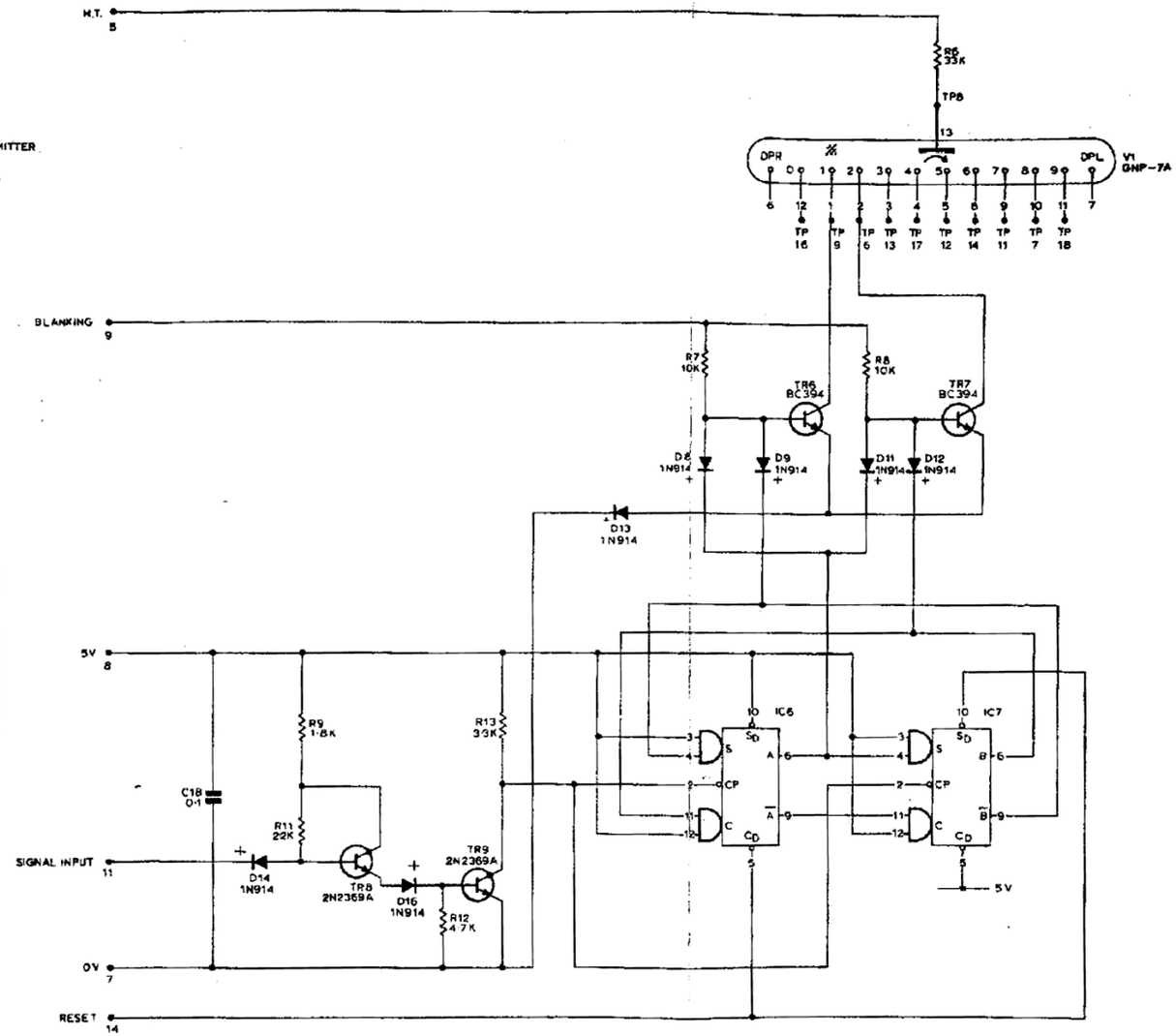
SINGLE J-K MASTER-SLAVE FLIP-FLOP (IC6 & IC7)

NOTES.

0 LOW, MORE NEGATIVE STATE.
1 HIGH, MORE POSITIVE STATE.
X IMMATERIAL, '0' OR '1' HAS EQUAL EFFECT.
NC NO CHANGE.

WITH BOTH DIRECT ENTRIES HIGH, CLOCKED ENTRIES APPLY, OTHERWISE DIRECT ENTRIES OVERRIDE CLOCKED ENTRIES.

COMPLETE CLOCKING CYCLE BETWEEN tn AND tn+1.



PLA (EDGE CONNECTOR)

NOS. 1-4, 6, 13, 15-18 SPARE
NOS. 10 & 12 ARE POLARIZING KEYS.

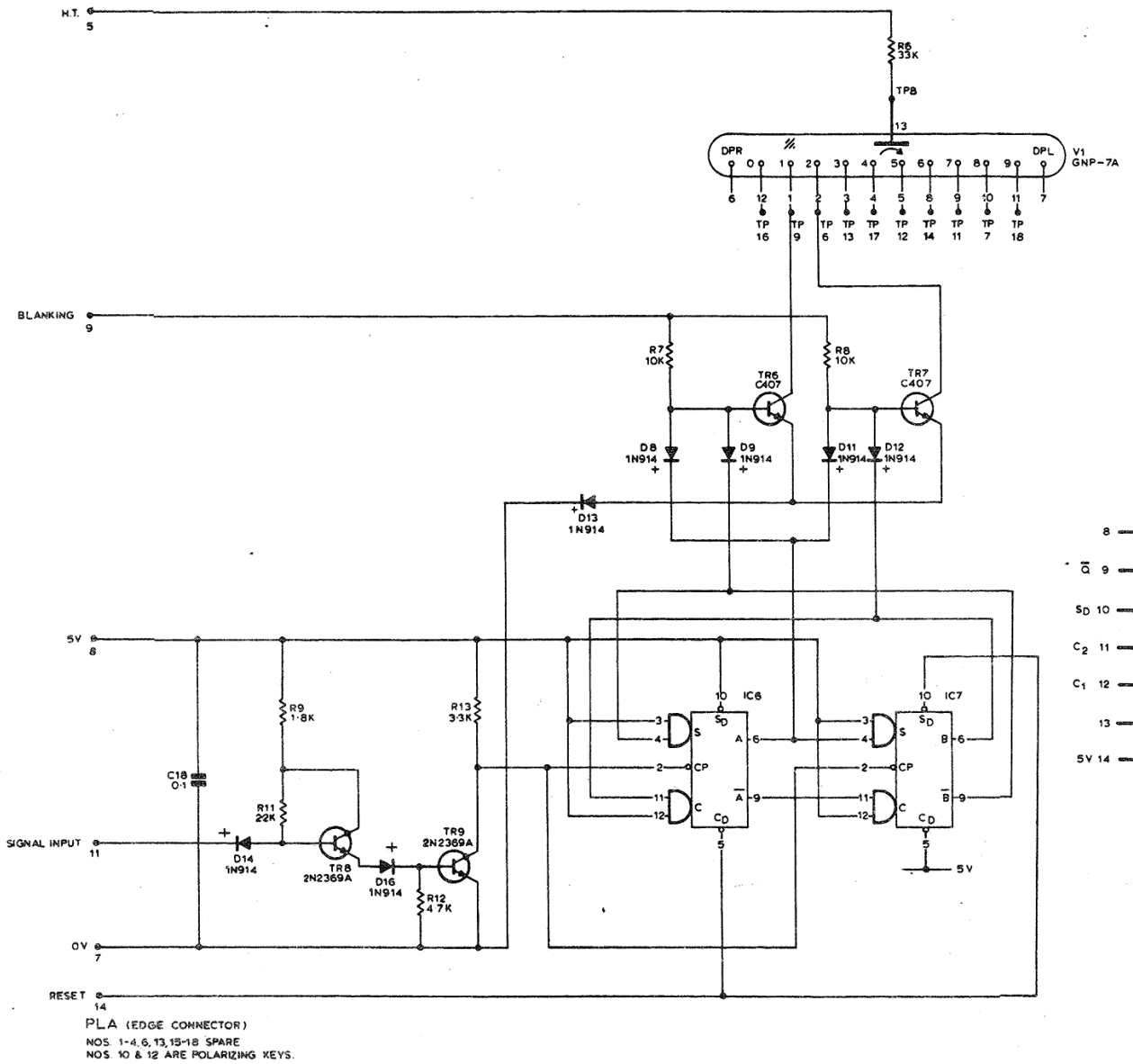
COUNTER UNIT N-42-1671-01
1 0MHz DIGIT DISPLAY BOARD N-42-1716-01
CIRCUIT DIAGRAM

UNIT 12A

4.81

N-42-1671Z Sh 2
ISSUE 2

A-ELLISON



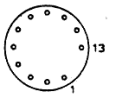
PLA (EDGE CONNECTOR)

NOS. 1-4, 6, 13, 15-18 SPARE
NOS. 10 & 12 ARE POLARIZING KEYS.

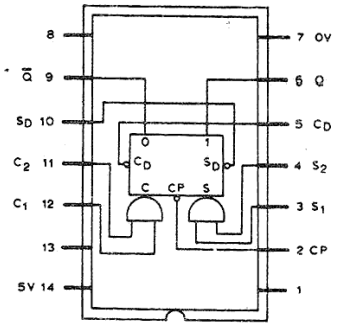
10 MHz COUNTER TRUTH TABLE

		A	B	DECODING	
RESET	0	0	1		
	1	0	0		
	2	1	0	A	$\overline{B}$
	3	1	1	A	B

TRANSISTOR BASES



UNDERSIDE VIEW OF V1 BASE



9945
SINGLE J-K MASTER-SLAVE FLIP-FLOP (IC6 & IC7)

9945 TRUTH TABLE

CLOCKED ENTRY					
INPUTS tn				OUTPUTS tn+1	
3	4	11	12	6	9
S_1	S_2	C_2	C_1	Q	$\overline{Q}$
0	X	0	X	NC	NC
0	X	X	0	NC	NC
X	0	0	X	NC	NC
X	0	X	0	NC	NC
0	X	1	1	0	1
X	0	1	1	0	1
1	1	0	X	1	0
1	1	X	0	1	0
1	1	1	1	UNDETERMINED	

DIRECT ENTRY			
INPUTS		OUTPUTS	
5	10	6	9
C_D	S_D	Q	$\overline{Q}$
1	1	NC	NC
1	0	1	0
0	1	0	1
0	0	1	1

NOTES.

0 LOW, MORE NEGATIVE STATE.
1 HIGH, MORE POSITIVE STATE.
X IMMATERIAL, '0' OR '1' HAS EQUAL EFFECT.
NC NO CHANGE.

WITH BOTH DIRECT ENTRIES HIGH, CLOCKED ENTRIES APPLY, OTHERWISE DIRECT ENTRIES OVERRIDE CLOCKED ENTRIES.

COMPLETE CLOCKING CYCLE BETWEEN tn AND tn+1.

UNIT 12A, 10MHz DIGIT DISPLAY BOARD N-42-1716-01

N2050 G.P./S.S.B. RECEIVER

UNIT 12, COUNTER UNIT N-42-1671-01
CIRCUIT

12A

N-42-1671 Z SH 2
ISSUE 1

4.81

Cross Reference List

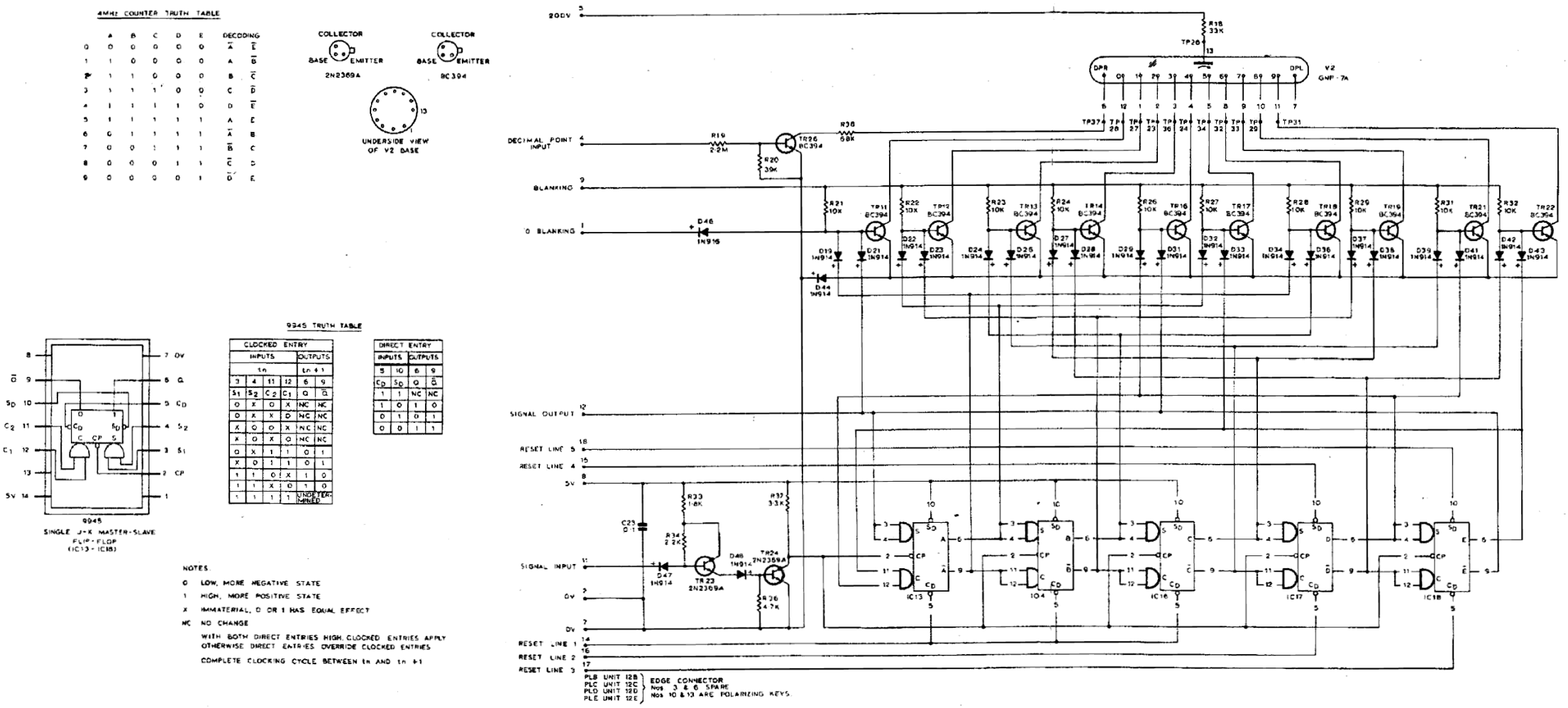
for

Apollo Receiver

4MHz Counter Board N-42-1717-01

Circuit Diagram (Unit 12 B-E)

Ref.	M.C.L. No.	Ref.	M.C.L. No.
C23	7	TR11	716
		TR12	716
		TR13	716
R18	274	TR14	716
R19	282	TR16	716
R20	337	TR17	716
R21	317	TR18	716
R22	317	TR19	716
R23	317	TR21	716
R24	317	TR22	716
R26	317	TR23	704
R27	317	TR24	704
R28	317	TR26	716
R29	317		
R31	317		
R32	317		
R33	315	IC13	754
R34	286	IC14	754
R36	262	IC16	754
R37	296	IC17	754
R38	322	IC18	754
D19	651	V2	800
D21	651		
D22	651		
D23	651		
D24	651		
D26	651		
D27	651		
D28	651		
D29	651		
D31	651		
D32	651		
D33	651		
D34	651		
D36	651		
D37	651		
D38	651		
D39	651		
D41	651		
D42	651		
D43	651		
D44	651		
D46	651		
D47	651		
D48	651		



COUNTER UNIT N-42-1671-01
4MHz COUNTER BOARD N-42-1717-01
CIRCUIT DIAGRAM

UNITS 12B-E

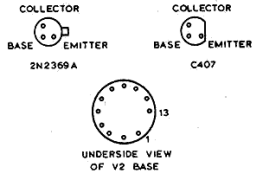
4.83

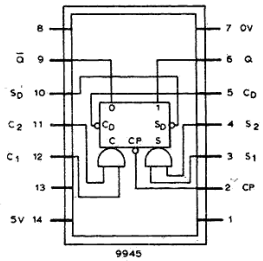
N-42-1671Z Sh.3
ISSUE 2

A-ELLISON

4MHz COUNTER TRUTH TABLE

	A	B	C	D	E	DECODING	
0	0	0	0	0	0	$\overline{A}$	$\overline{E}$
1	1	0	0	0	0	A	$\overline{B}$
2	1	1	0	0	0	B	$\overline{C}$
3	1	1	1	0	0	C	$\overline{D}$
4	1	1	1	1	0	D	$\overline{E}$
5	1	1	1	1	1	A	E
6	0	1	1	1	1	$\overline{A}$	B
7	0	0	1	1	1	$\overline{B}$	C
8	0	0	0	1	1	$\overline{C}$	D
9	0	0	0	0	1	$\overline{D}$	E





9945 TRUTH TABLE

CLOCKED ENTRY					
INPUTS				OUTPUTS	
tn				tn + 1	
3	4	11	12	6	9
S_1	S_2	C_2	C_1	Q	$\overline{Q}$
0	X	0	X	NC	NC
0	X	X	0	NC	NC
X	0	0	X	NC	NC
X	0	X	0	NC	NC
0	X	1	1	0	1
X	0	1	1	0	1
1	1	0	X	1	0
1	1	X	0	1	0
1	1	1	1	UNDETERMINED	

DIRECT ENTRY			
INPUTS		OUTPUTS	
5	10	6	9
C_D	S_D	Q	$\overline{Q}$
1	1	NC	NC
1	0	1	0
0	1	0	1
0	0	1	1

NOTES.

0 LOW, MORE NEGATIVE STATE

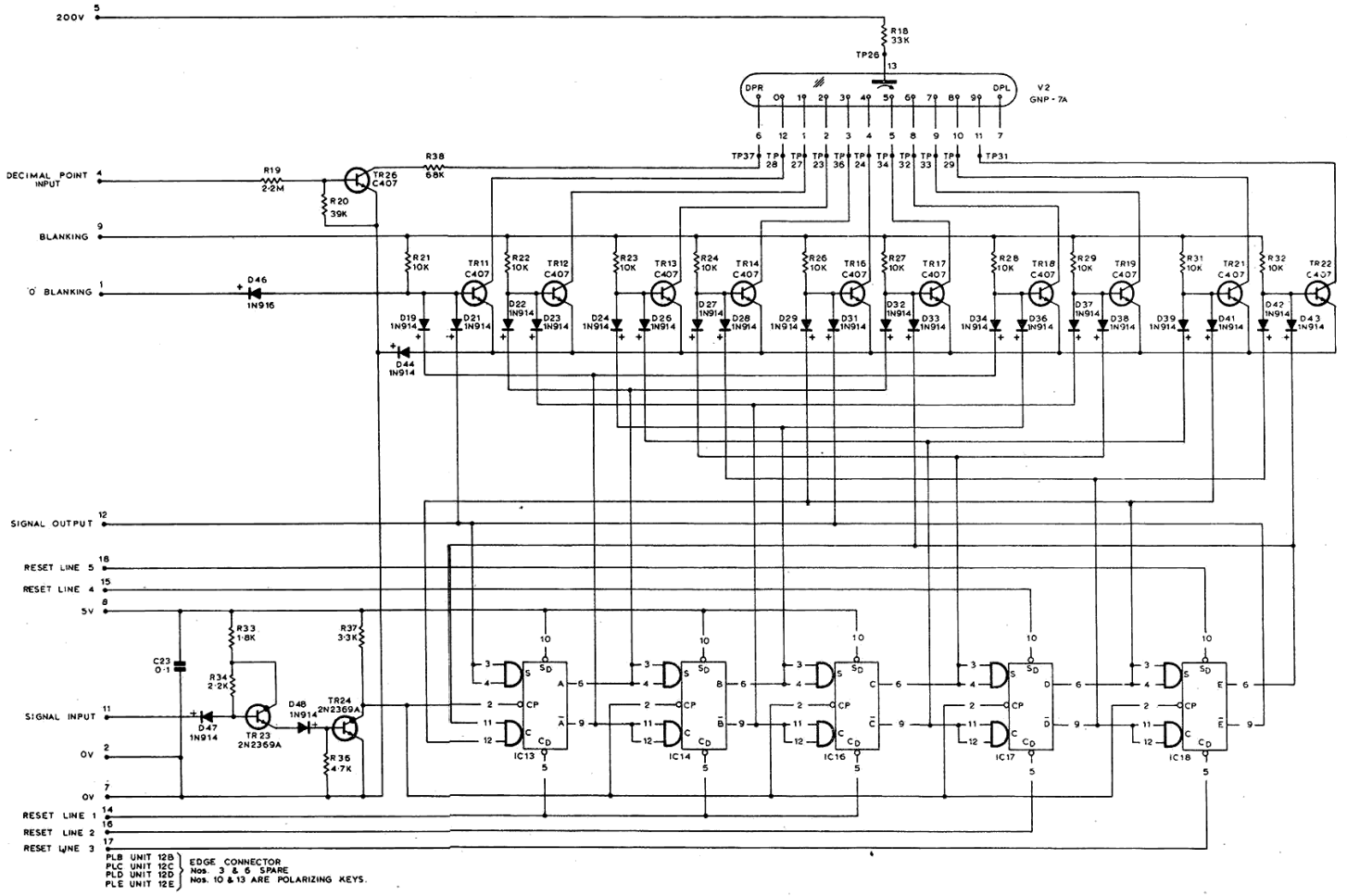
1 HIGH, MORE POSITIVE STATE

X IMMATERIAL, 0 OR 1 HAS EQUAL EFFECT

NC NO CHANGE

WITH BOTH DIRECT ENTRIES HIGH, CLOCKED ENTRIES APPLY OTHERWISE DIRECT ENTRIES OVERRIDE CLOCKED ENTRIES.

COMPLETE CLOCKING CYCLE BETWEEN tn AND tn +1.



COUNTER UNIT N-42-1671-01
4MHz COUNTER BOARD N-42-1717-01
CIRCUIT DIAGRAM

UNITS 12B-E

Cross Reference List

for

Apollo Receiver
30MHz Counter Board N-42-1718-01/02
Circuit Diagram (Unit 12F)

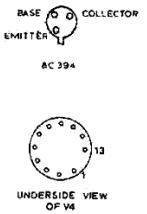
Ref.	M.C.L. No.
C29	7
C31	82
C32	82
C33	82
C34	82
C36	82
R41	274
R42	317
R43	317
R44	317
R46	317
R47	317
R48	317
R49	317
R51	317
R52	317
R53	317
R54	304
R56	304
R57	304
R58	304
R59	304
L21	500
D51	651
D52	651
D53	651
D54	651
D56	651
D57	651
D58	651
D59	651
D61	651
D62	651
D63	651
D64	651
D66	651
D67	651
D68	651
D69	651
D71	651
D72	651
D73	651

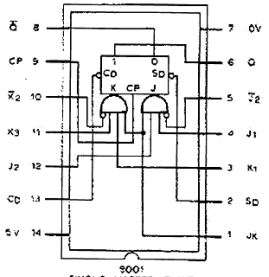
Ref.	M.C.L. No.		
		Edn.01	Edn.02
D74	651		
D76	651		
TR28	716		
TR29	716		
TR31	716		
TR32	716		
TR33	716		
TR34	716		
TR36	716		
TR37	716		
TR38	716		
TR39	716		
IC23	753	753A	See Note
IC24	753	753A	
IC26	753	753A	
IC27	753	753A	
IC28	753	753A	
V4	800		

NOTE...
Edition 01 on Receivers up to S/No.792 (inc).
Edition 02 on Receivers S/Nos. 793 onwards.

30MHz COUNTER TRUTH TABLE

	A	B	C	D	E	DECODING
0	0	0	0	0	0	$\bar{A}\bar{E}$
1	1	0	0	0	0	$A\bar{E}$
2	1	1	0	0	0	$AB\bar{E}$
3	1	1	1	0	0	$ABC\bar{E}$
4	1	1	1	1	0	$ABCD\bar{E}$
5	1	1	1	1	1	$\bar{A}E$
6	0	1	1	1	1	$\bar{B}CDE$
7	0	0	1	1	1	$\bar{C}DE$
8	0	0	0	1	1	$\bar{D}E$
9	0	0	0	0	1	$\bar{E}$





900ŝ
SINGLE MASTER-SLAVE J-K FLIP-FLOP (IC23-IC28)

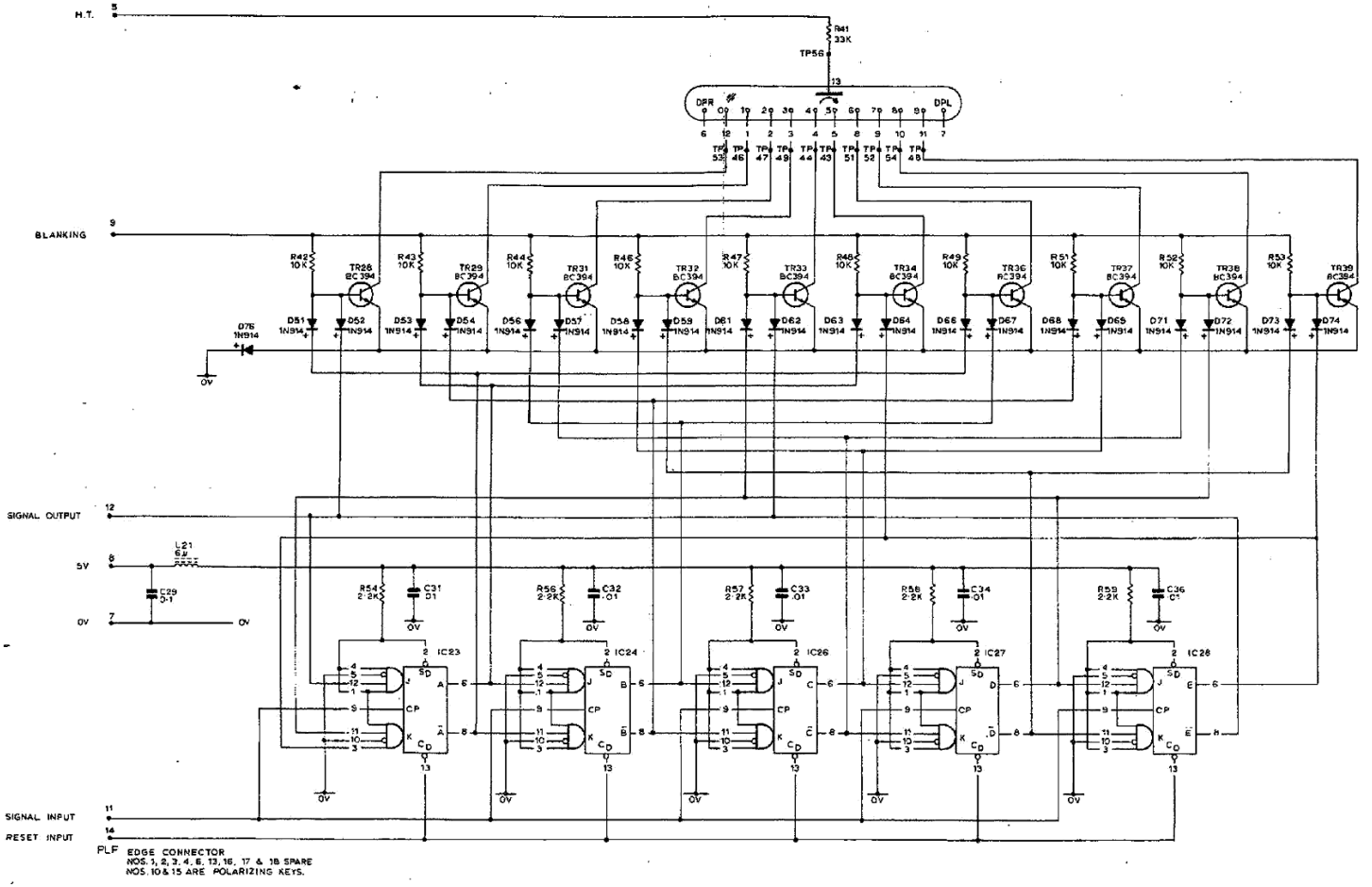
J-K MODE TRUTH TABLE

INPUTS tn								OUTPUTS tn+1	
1	4	5	12	3	10	11	6	8	
JK	J_1	J_2	J_3	K_1	K_2	K_3	Q	$\bar{Q}$	
0		X			X		NC	NC	
1		0			0		NC	NC	
1		0			1		0	1	
1		1			0		1	0	
1		1			1		TOGGLES		

DIRECT ENTRY

INPUTS		OUTPUTS	
13	2	6	8
$\bar{C}_D$	$\bar{S}_D$	Q	$\bar{Q}$
1	1	NC	NC
1	0	1	0
0	1	0	1
0	0	1	1

NOTES
0 LOW, MORE NEGATIVE STATE
1 HIGH, MORE POSITIVE STATE
NC NO CHANGE
WITH BOTH DIRECT ENTRIES HIGH, CLOCKED ENTRIES APPLY, OTHERWISE DIRECT ENTRIES OVERRIDE CLOCKED ENTRIES
CLOCKED ENTRIES COMPLETE CLOCKING CYCLE BETWEEN tn AND tn+1



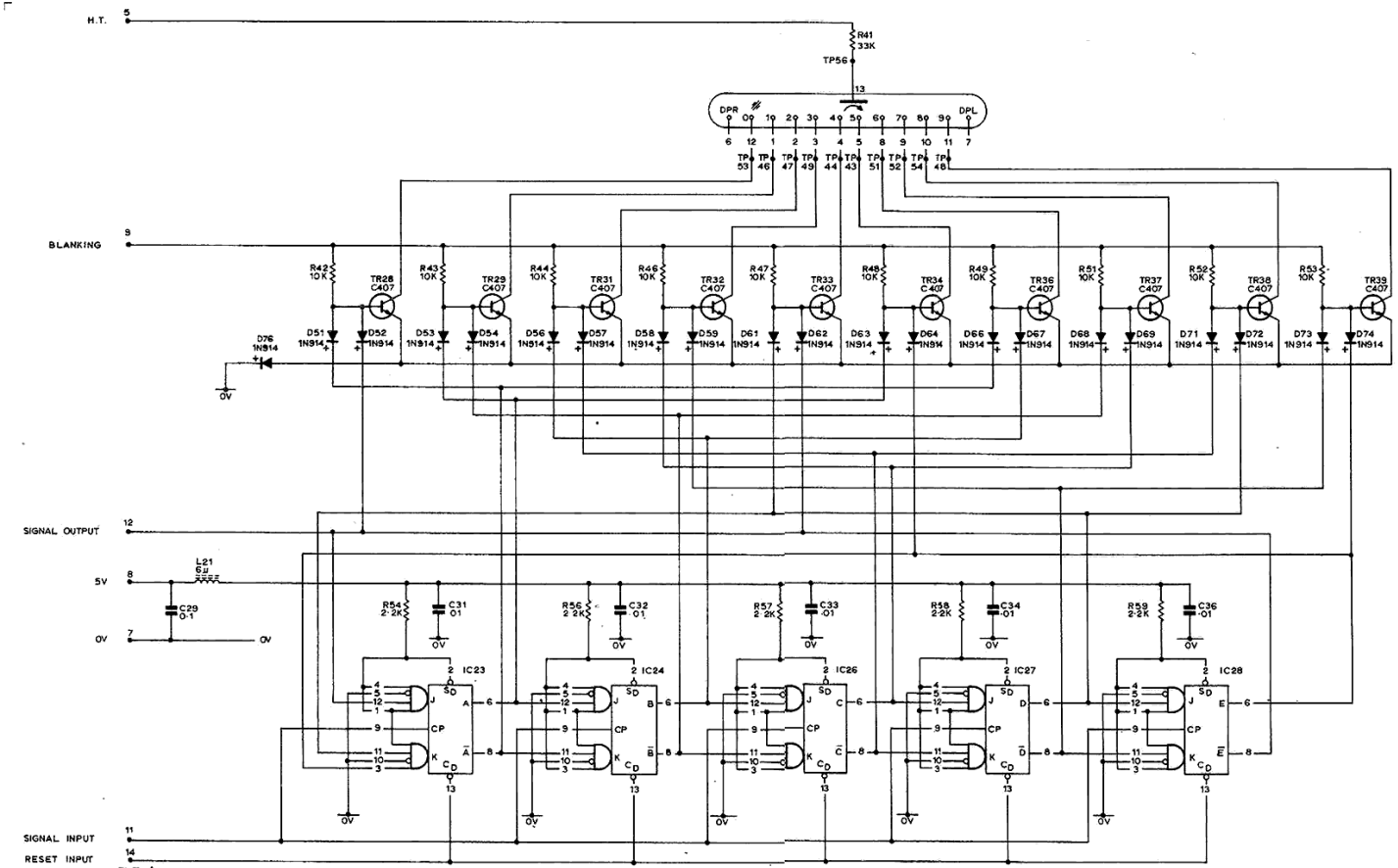
PLF EDGE CONNECTOR
NOS. 1, 2, 3, 4, 6, 13, 16, 17 & 18 SPARE
NOS. 10 & 15 ARE POLARIZING KEYS.

COUNTER UNIT N-42-1671-01
30MHz COUNTER BOARD N-42-1718-01/02
CIRCUIT DIAGRAM

UNIT 12F

4.85

N-42-1671Z Sh.4
ISSUE 2



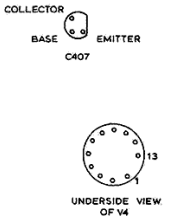
UNIT 12F, 30 MHz COUNTER BOARD N-42-1718-01

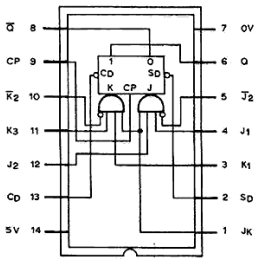
N2050 G.P./S.S.B. RECEIVER

N-42-1671Z SH.4
ISSUE 1

30 MHz COUNTER TRUTH TABLE

	A	B	C	D	E	DECODING
0	0	0	0	0	0	A B C D E
1	1	0	0	0	0	A B C D E
2	1	1	0	0	0	A B C D E
3	1	1	1	0	0	A B C D E
4	1	1	1	1	0	A B C D E
5	1	1	1	1	1	A B C D E
6	0	1	1	1	1	A B C D E
7	0	0	1	1	1	A B C D E
8	0	0	0	1	1	A B C D E
9	0	0	0	0	1	A B C D E





J-K MODE TRUTH TABLE

INPUTS							OUTPUTS	
tn							tn+1	
1	4	5	12	3	10	11	6	8
J_K	J_1	J_2	J_3	K_1	K_2	K_3	Q	$\overline{Q}$
0		X			X		NC	NC
1		0			0		NC	NC
1		0			1		0	1
1		1			0		1	0
1		1			1		TOGGLES	

DIRECT ENTRY

INPUTS		OUTPUTS	
13	2	6	8
C_D	S_D	Q	$\overline{Q}$
1	1	NC	NC
1	0	1	0
0	1	0	1
0	0	1	1

NOTES
- 0 LOW, MORE NEGATIVE STATE.
- 1 HIGH, MORE POSITIVE STATE.
- NC NO CHANGE.
- WITH BOTH DIRECT ENTRIES HIGH, CLOCKED ENTRIES APPLY, OTHERWISE DIRECT ENTRIES OVERRIDE CLOCKED ENTRIES.
- COMPLETE CLOCKING CYCLE BETWEEN tn AND tn+1

UNIT 12, COUNTER UNIT N-42-1671-01 CIRCUIT

Cross Reference List

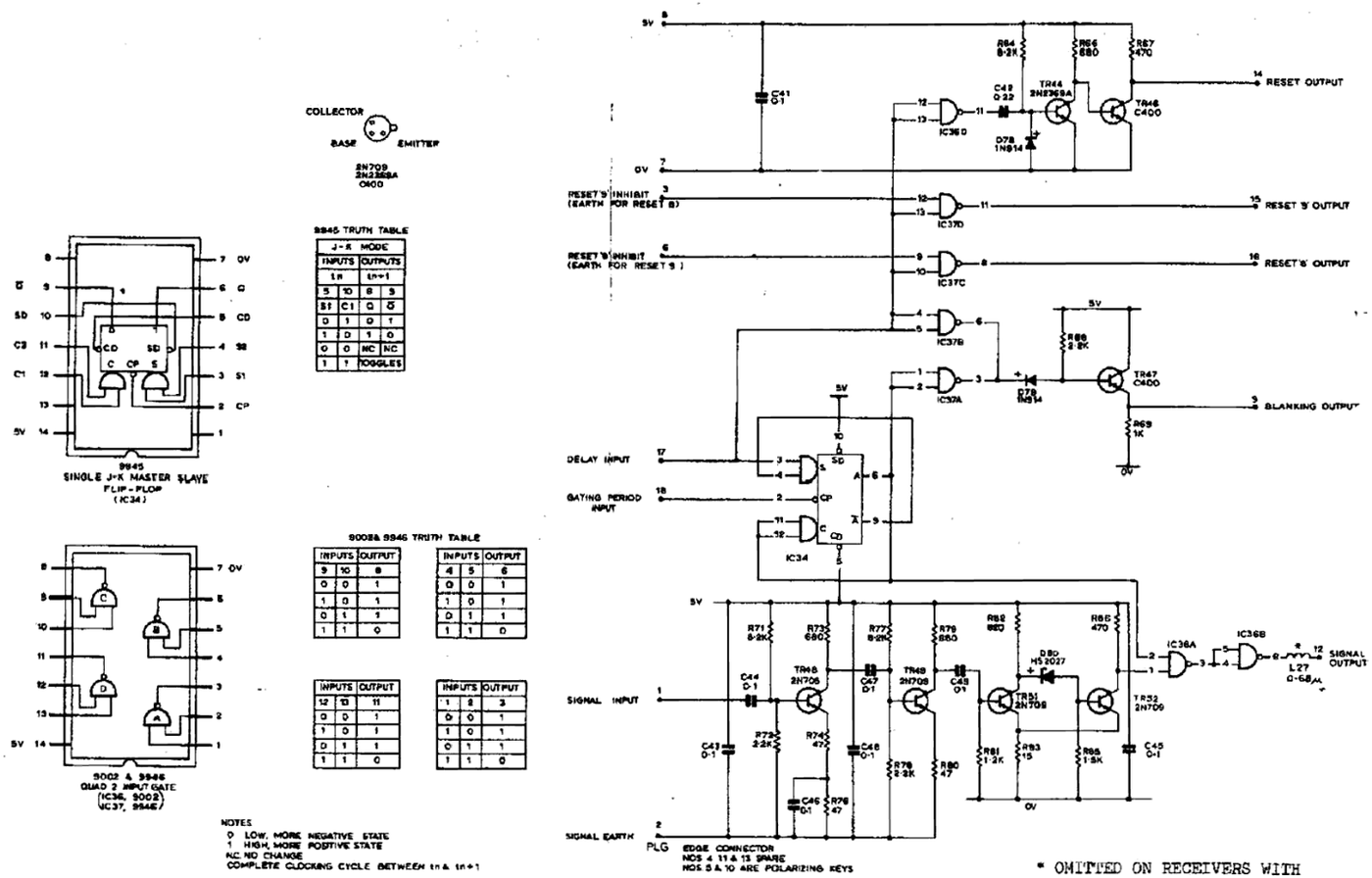
for

Apollo Receiver
Control Board N-42-1719-01
(For Receivers up to Serial Number 792 inc.)
Circuit Diagram (Unit 12G)

Ref.	M.C.L. No.	Ref.	M.C.L. No.
C41	7	IC34	754
C42	39	*IC36	756
C43	7	IC37	757
C44	7		
C45	140		
C46	140		
C47	7		
C48	7		
C49	7		
R64	313		
R66	311		
R67	331		
R68	286		
R69	263		
R71	313		
R72	286		
R73	311		
R74	325		
R76	325		
R77	313		
R78	286		
R79	311		
R80	325		
R81	287		
R82	342		
R83	374		
R85	321		
R86	331		
*L27	561		
D78	651		
D79	651		
D80	664		
TR44	704		
TR46	712		
TR47	712		
TR48	718		
TR49	718		
TR51	718		
TR52	718		

* IC36 IS MCL NO. 759 AND L27 IS OMITTED ON RECEIVERS WITH THE FOLLOWING SERIAL NUMBERS:

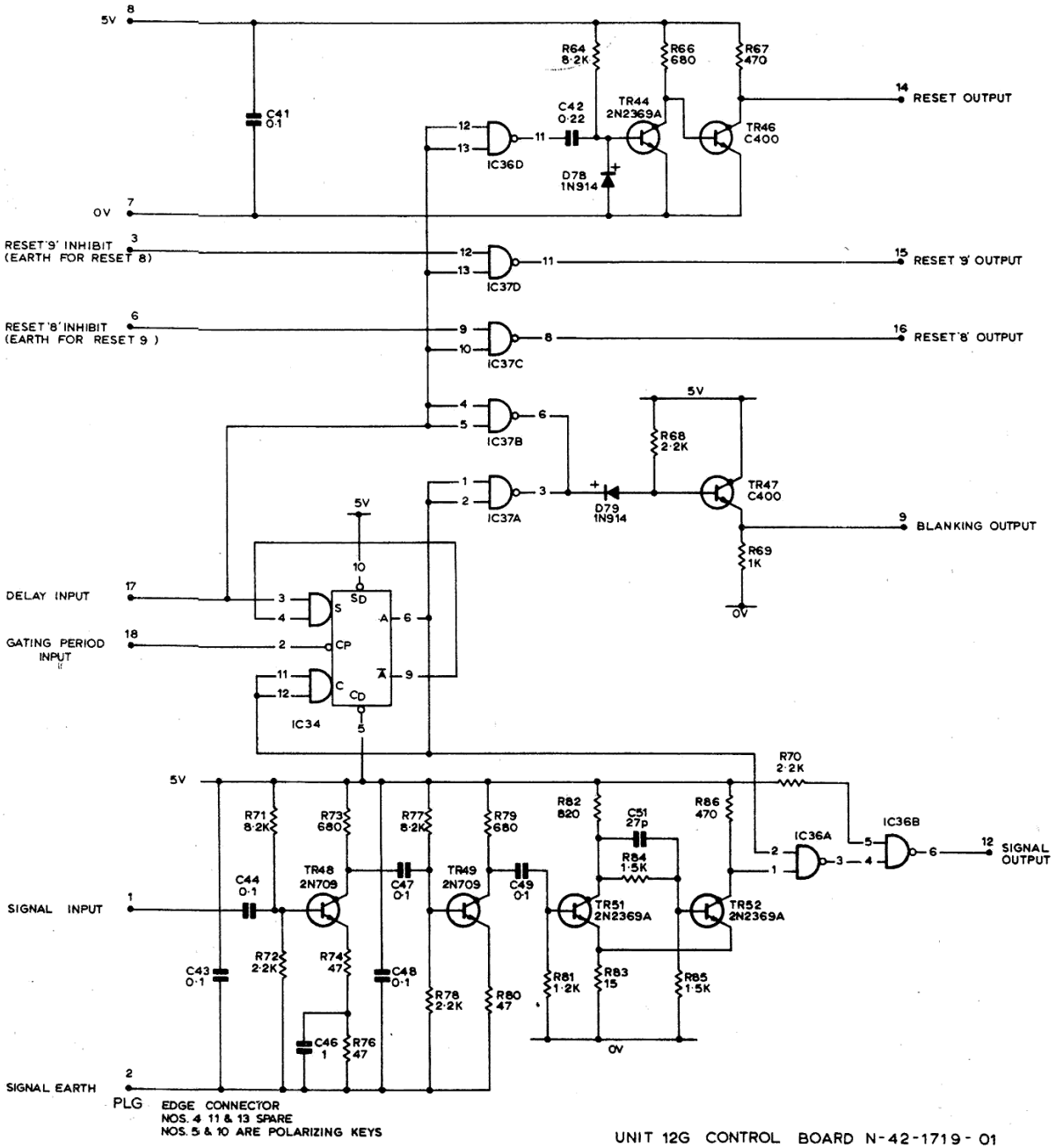
718, 719, 721, 722, 727, 733, 767, 774, 781.



* OMITTED ON RECEIVERS WITH SERIAL NOS. 718, 719, 721, 722, 727, 733, 767, 774, 781

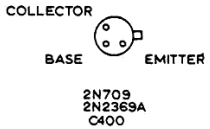
COUNTER UNIT N-42-1671-01
CONTROL BOARD N-42-1719-01
(RECEIVERS UP TO S/No.792)
CIRCUIT DIAGRAM

UNIT 12G

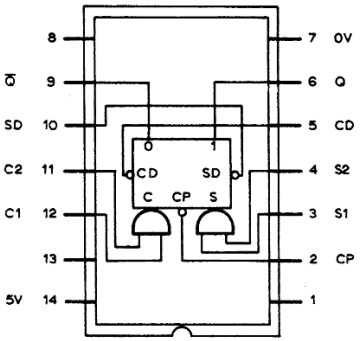


UNIT 12G CONTROL BOARD N-42-1719-01

N2050 G.P./S.S.B. RECEIVER



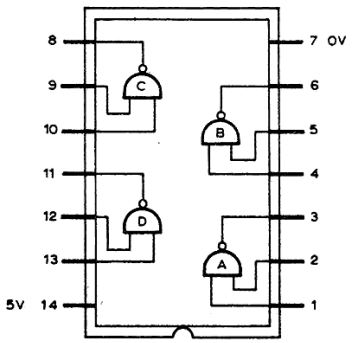
2N709
2N2369A
C400



9945
SINGLE J-K MASTER SLAVE FLIP-FLOP (IC34)

9945 TRUTH TABLE
COMPLETE CLOCKING CYCLE BETWEEN tn & tn+1

J-K MODE			
INPUTS		OUTPUTS	
tn		tn+1	
5	10	6	9
S1	C1	Q	$\bar{Q}$
0	1	0	1
1	0	1	0
0	0	NC	NC
1	1	TOGGLES	



9002 & 9946
QUAD 2 INPUT GATE
(IC36, 9002)
(IC37, 9946)

9002& 9946 TRUTH TABLE

INPUTS		OUTPUT
9	10	8
0	0	1
1	0	1
0	1	1
1	1	0

INPUTS		OUTPUT
4	5	6
0	0	1
1	0	1
0	1	1
1	1	0

INPUTS		OUTPUT
12	13	11
0	0	1
1	0	1
0	1	1
1	1	0

INPUTS		OUTPUT
1	2	3
0	0	1
1	0	1
0	1	1
1	1	0

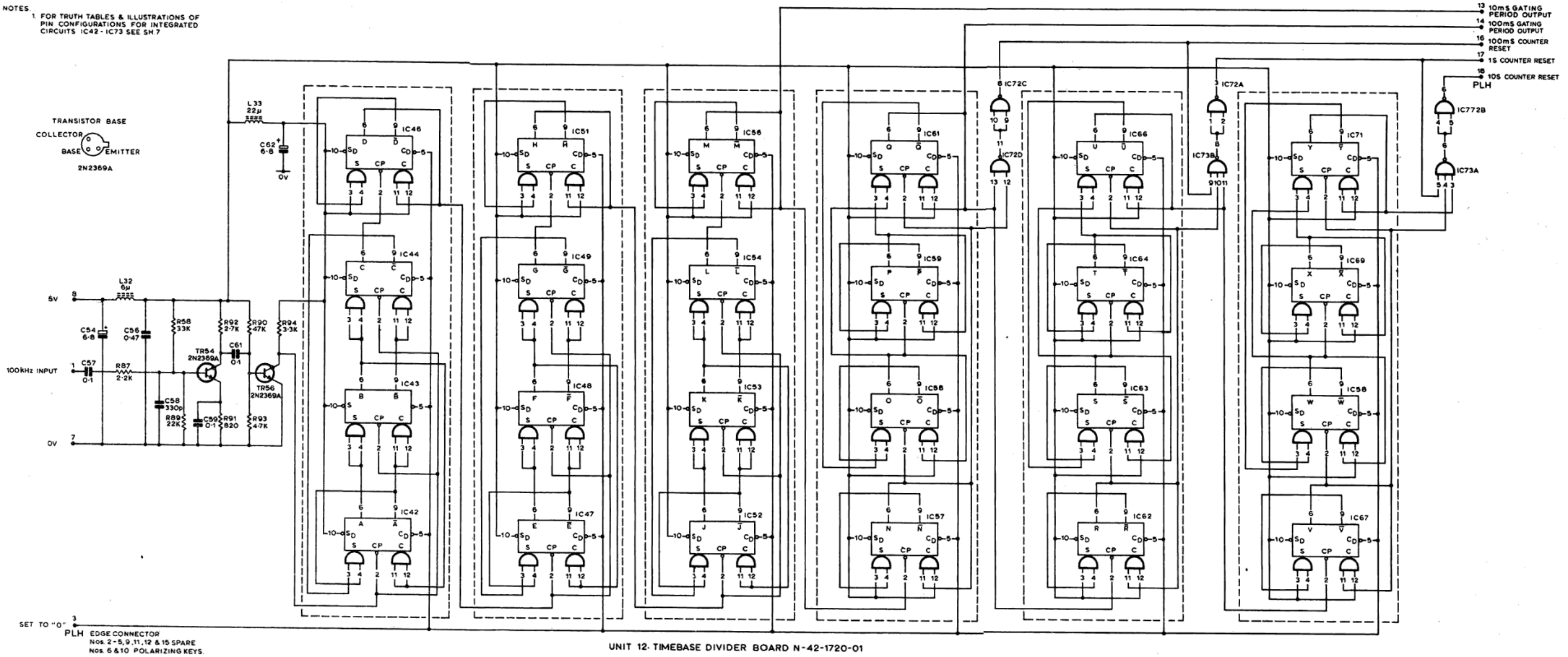
NOTES
0 LOW, MORE NEGATIVE STATE
1 HIGH, MORE POSITIVE STATE
NC. NO CHANGE
COMPLETE CLOCKING CYCLE BETWEEN tn & tn+1

UNIT 12, COUNTER UNIT N-42-1671-01
CIRCUIT

12G

A-ERICSSON

NOTES.
1. FOR TRUTH TABLES & ILLUSTRATIONS OF PIN CONFIGURATIONS FOR INTEGRATED CIRCUITS IC42 - IC73 SEE SH.7



UNIT 12- TIMEBASE DIVIDER BOARD N-42-1720-01

N2050 GP/S.S.B. RECEIVER

UNIT 12 COUNTER UNIT N-42-1671-01 CIRCUIT.

N-42-1671Z SH.6
ISSUE 1

4.89

Cross Reference List

for

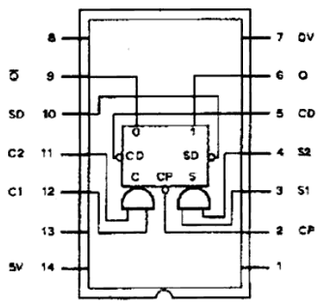
Apollo Receiver

Control Board N-42-1719-01 (V2) and -02
(Receivers Serial Numbers 793 onwards)

Circuit Diagram (Unit 12G)

Ref.	MCL No.	Ref.	MCL No.
C41	7	*R95	273
C42	39	*R96	263
C43	7		
C44	7	D78	651
C45	140	D79	651
		D80	664
C46	140	*D81	651
C47	7		
C48	7	TR44	704
C49	145	TR46	712
*C50	56	TR47	712
		TR48	718
R64	313	TR49	718
R66	311		
R67	331	*TR51	718
R68	286	*TR52	718
R69	263	*TR53	704
R71	313	IC34	754
R72	286	IC36	759
R73	311	IC37	757
R74	325		
R76	325		
R77	313		
R78	286		
R79	311		
R80	276		
*R81	338		
*R82	303		
*R83	260		
*R84	314		
*R85	321		
*R86	277		

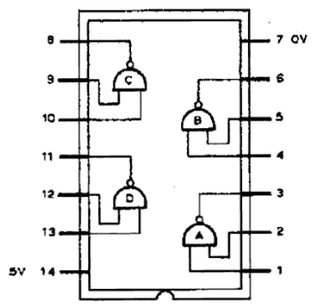
*COMPONENTS MARKED THUS ARE MOUNTED ON A SEPARATE BOARD (N42-4670-01) ON RECEIVERS WITH SERIAL NUMBERS 793-993 INC.



9945
SINGLE J-K MASTER SLAVE
FLIP-FLOP
(IC34)

9945 TRUTH TABLE

J-K MODE			
INPUTS		OUTPUTS	
tn		tn+1	
S	10	6	9
S1	C1	Q	$\bar{Q}$
0	1	0	1
1	0	1	0
0	0	NC	NC
1	1	TOGGLES	



74S00/N & 9946
QUAD 2 INPUT GATE
(IC36, 74S00/N)
(IC37, 9946)

74S00/N & 9946 TRUTH TABLE

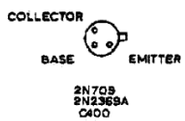
INPUTS		OUTPUT
9	10	8
0	0	1
1	0	1
0	1	1
1	1	0

INPUTS		OUTPUT
4	5	6
0	0	1
1	0	1
0	1	1
1	1	0

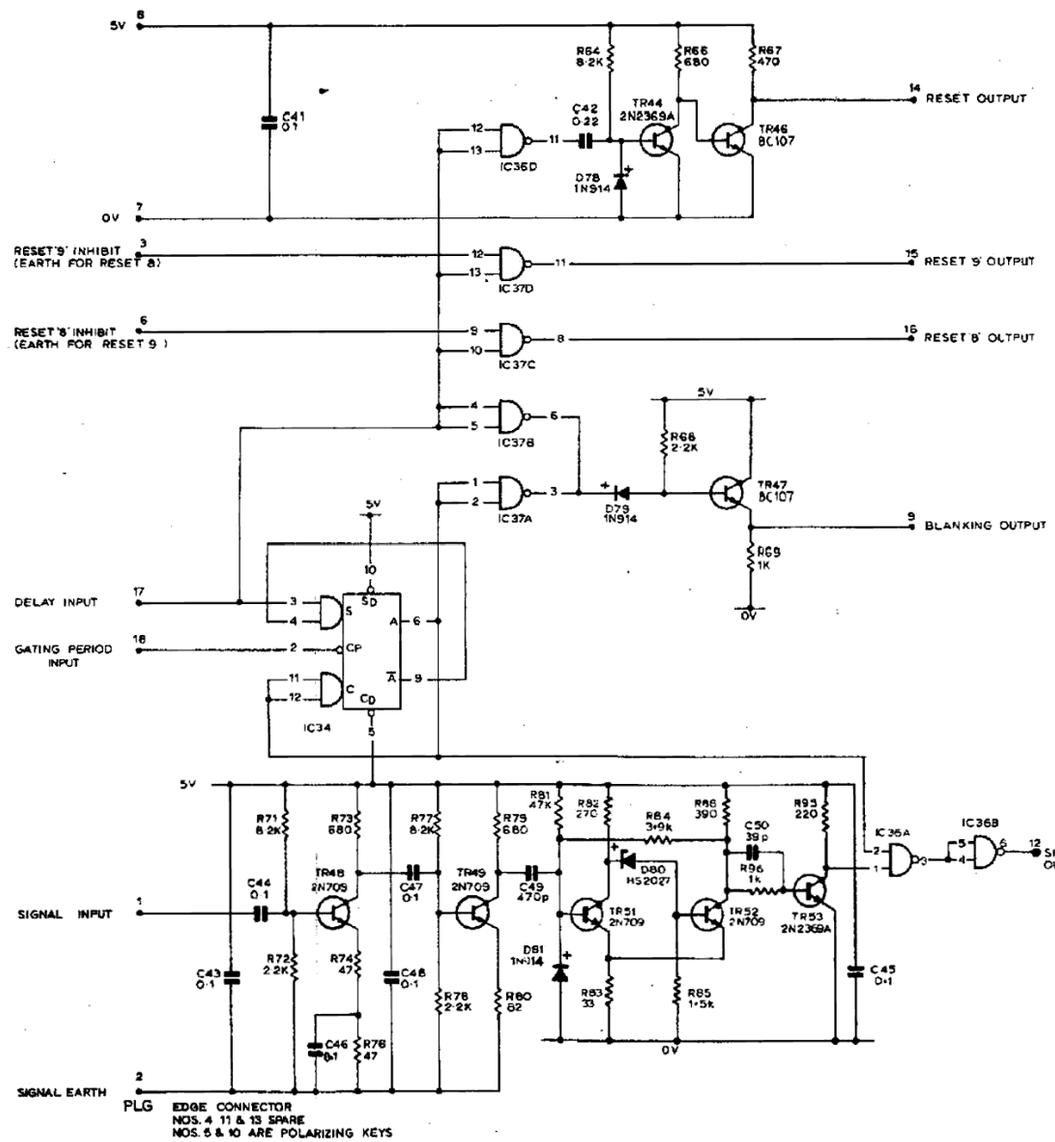
INPUTS		OUTPUT
12	13	11
0	0	1
1	0	1
0	1	1
1	1	0

INPUTS		OUTPUT
1	2	3
0	0	1
1	0	1
0	1	1
1	1	0

NOTES
0 LOW, MORE NEGATIVE STATE
1 HIGH, MORE POSITIVE STATE
NC NO CHANGE
COMPLETE CLOCKING CYCLE BETWEEN tn & tn+1



2N709
2N2369A
G400



PLG EDGE CONNECTOR
NOS. 4 11 & 13 SPARE
NOS. 5 & 10 ARE POLARIZING KEYS

COUNTER UNIT N42-1671-01
CONTROL BOARD N42-1719-01(V2) &-02
(RECEIVERS AFTER SERIAL No.793)
CIRCUIT DIAGRAM

UNIT 12G

Cross Reference List

for

Apollo Receiver

Timebase divider Board N-42-1720-01

Circuit Diagram (Unit 12H)

Ref.	M.C.L. No.	Ref.	M.C.L. No.
C54	113	IC42	754
C56	12	IC43	754
C57	7	IC44	754
C58	147	IC46	754
C59	7	IC47	754
C61	7	IC48	754
C62	113	IC49	754
		IC51	754
		IC52	754
R87	286	IC53	754
R88	274	IC54	754
R89	285	IC56	754
R90	338	IC57	754
R91	342	IC58	754
R92	332	IC59	754
R93	262	IC61	754
R94	296	IC62	754
		IC63	754
L32	500	IC64	754
L33	562	IC66	754
		IC67	754
TR54	704	IC68	754
TR56	704	IC69	754
		IC71	754
		IC72	757
		IC73	755

CODED BIQUINARY DECADE DIVIDER TRUTH TABLE

	A E J	B F K	C G L	D H M
0	0	0	0	0
1	1	0	0	0
2	1	1	0	0
3	0	1	1	0
4	0	0	1	0
5	0	0	0	1
6	1	0	0	1
7	1	1	0	1
8	0	1	1	1
9	0	0	1	1

RIPPLE THROUGH DECADE DIVIDER TRUTH TABLE

	N R V	O S W	P T X	Q U Y
0	0	0	0	0
1	1	0	0	0
2	0	1	0	0
3	1	1	0	0
4	0	0	1	0
5	1	0	1	0
6	0	1	1	0
7	1	1	1	0
8	0	0	0	1
9	1	0	0	1

NOTES

0 LOW, MORE NEGATIVE STATE.

1 HIGH, MORE POSITIVE STATE

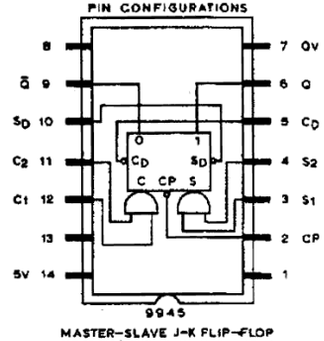
X IMMATERIAL, 0 OR 1 HAS EQUAL EFFECT

NC NO CHANGE.

COMPLETE CLOCKING CYCLE BETWEEN tn AND tn + 1

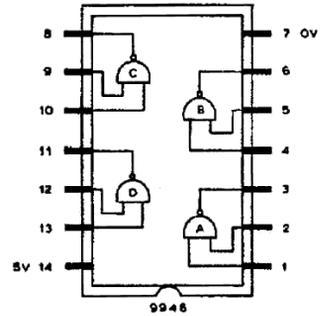
WITH BOTH DIRECT ENTRIES HIGH, CLOCKED ENTRIES APPLY, OTHERWISE DIRECT ENTRIES OVERRIDE CLOCKED ENTRIES.

PIN CONFIGURATIONS



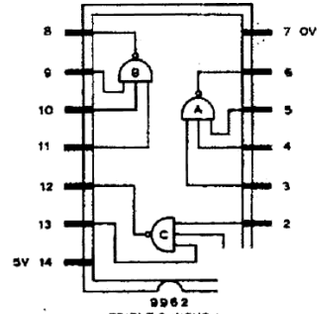
9945

MASTER–SLAVE J–K FLIP–FLOP
(IC42–IC44, IC46–IC49, IC51–IC54, IC56–IC59, IC61–IC64, IC66–IC69 & IC71)



9946

QUAD. 2 INPUT GATE
(IC72)



9962

TRIPLE 3 INPUT (
(IC73)

TRUTH TABLES

CLOCKED ENTRY					
INPUTS				OUTPUTS	
tn				tn+1	
3	4	11	12	6	9
S_1	S_2	C_2	C_1	Q	$\bar{Q}$
0	X	0	X	NC	NC
0	X	X	0	NC	NC
X	0	0	X	NC	NC
X	0	X	0	NC	NC
0	X	1	1	0	1
X	0	1	1	0	1
1	1	0	X	1	0
1	1	X	0	1	0
1	1	1	1	UNDETER-MINED	

DIRECT ENTRY			
INPUTS		OUTPUTS	
5	10	6	9
C_D	S_D	Q	$\bar{Q}$
1	1	NC	NC
1	0	1	0
0	1	0	1
0	0	1	1

INPUTS		OUTPUT
9	10	8
0	0	1
1	0	1
0	1	1
1	1	0

INPUTS		OUTPUT
4	5	6
0	0	1
1	0	1
0	1	1
1	1	0

INPUTS		OUTPUT
12	13	11
0	0	1
1	0	1
0	1	0
1	1	0

INPUTS		OUTPUT
1	2	3
0	0	1
1	0	1
0	1	1
1	1	0

INPUTS			OUTPUT
3	4	5	6
0	0	0	1
0	0	1	1
0	1	1	1
0	1	0	1
1	0	0	1
1	1	0	1
1	0	1	1
1	1	1	0

INPUTS			OUTPUT
9	10	11	8
0	0	0	1
0	0	1	1
0	1	1	1
0	1	0	1
1	0	0	1
1	1	0	1
1	0	1	1
1	1	1	0

COUNTER UNIT N-42-1671-01
TIMEBASE DIVIDER BOARD N-42-1720-01
TRUTH TABLES AND IC PIN CONFIGURATIONS

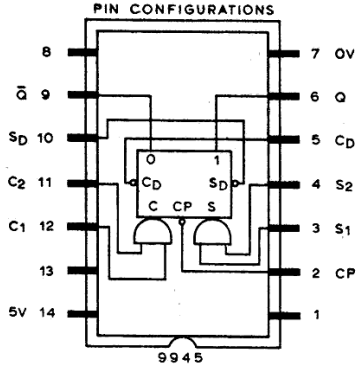
UNIT 12H

A. PARKSON

CODED BIQUINARY DECADE DIVIDER TRUTH TABLE

	A	B	C	D
	E	F	G	H
	J	K	L	M
0	0	0	0	0
1	1	0	0	0
2	1	1	0	0
3	0	1	1	0
4	0	0	1	0
5	0	0	0	1
6	1	0	0	1
7	1	1	0	1
8	0	1	1	1
9	0	0	1	1

PIN CONFIGURATIONS



9945

MASTER-SLAVE J-K FLIP-FLOP
(IC42-IC44, IC46-IC49, IC51-IC54, IC56-IC59, IC61-IC64, IC66-IC69 & IC71)

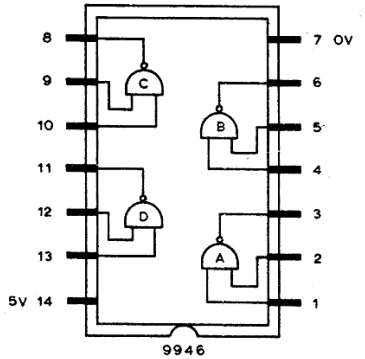
TRUTH TABLES

CLOCKED ENTRY					
INPUTS				OUTPUTS	
tn				tn + 1	
3	4	11	12	6	9
S_1	S_2	C_2	C_1	Q	$\overline{Q}$
0	X	0	X	NC	NC
0	X	X	0	NC	NC
X	0	0	X	NC	NC
X	0	X	0	NC	NC
0	X	1	1	0	1
X	0	1	1	0	1
1	1	0	X	1	0
1	1	X	0	1	0
1	1	1	1	UNDETER-MINED	

DIRECT ENTRY			
INPUTS		OUTPUTS	
5	10	6	9
C_D	S_D	Q	$\overline{Q}$
1	1	NC	NC
1	0	1	0
0	1	0	1
0	0	1	1

RIPPLE THROUGH DECADE DIVIDER TRUTH TABLE

	N	O	P	Q
	R	S	T	U
	V	W	X	Y
0	0	0	0	0
1	1	0	0	0
2	0	1	0	0
3	1	1	0	0
4	0	0	1	0
5	1	0	1	0
6	0	1	1	0
7	1	1	1	0
8	0	0	0	1
9	1	0	0	1



9946

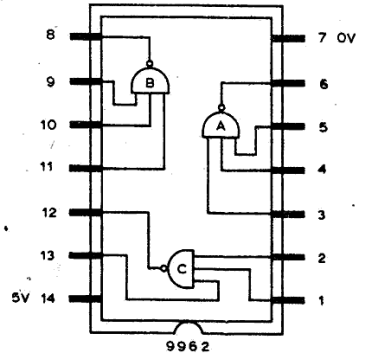
QUAD. 2 INPUT GATE
(IC72)

INPUTS		OUTPUT
9	10	8
0	0	1
1	0	1
0	1	1
1	1	0

INPUTS		OUTPUT
4	5	6
0	0	1
1	0	1
0	1	1
1	1	0

INPUTS		OUTPUT
12	13	11
0	0	1
1	0	1
0	1	0
1	1	0

INPUTS		OUTPUT
1	2	3
0	0	1
1	0	1
0	1	1
1	1	0



9962

TRIPLE 3 INPUT GATE
(IC73)

INPUTS			OUTPUT
3	4	5	6
0	0	0	1
0	0	1	1
0	1	1	1
0	1	0	1
1	0	0	1
1	1	0	1
1	0	1	1
1	1	1	0

INPUTS			OUTPUT
9	10	11	8
0	0	0	1
0	0	1	1
0	1	1	1
0	1	0	1
1	0	0	1
1	1	0	1
1	0	1	1
1	1	1	0

NOTES

0 LOW, MORE NEGATIVE STATE.

1 HIGH, MORE POSITIVE STATE.

X IMMATERIAL, 0 OR 1 HAS EQUAL EFFECT.

NC NO CHANGE.

COMPLETE CLOCKING CYCLE BETWEEN tn AND tn + 1.

WITH BOTH DIRECT ENTRIES HIGH, CLOCKED ENTRIES APPLY, OTHERWISE DIRECT ENTRIES OVERRIDE CLOCKED ENTRIES.

UNIT 12H TIMEBASE DIVIDER
BOARD N-42-1720-01

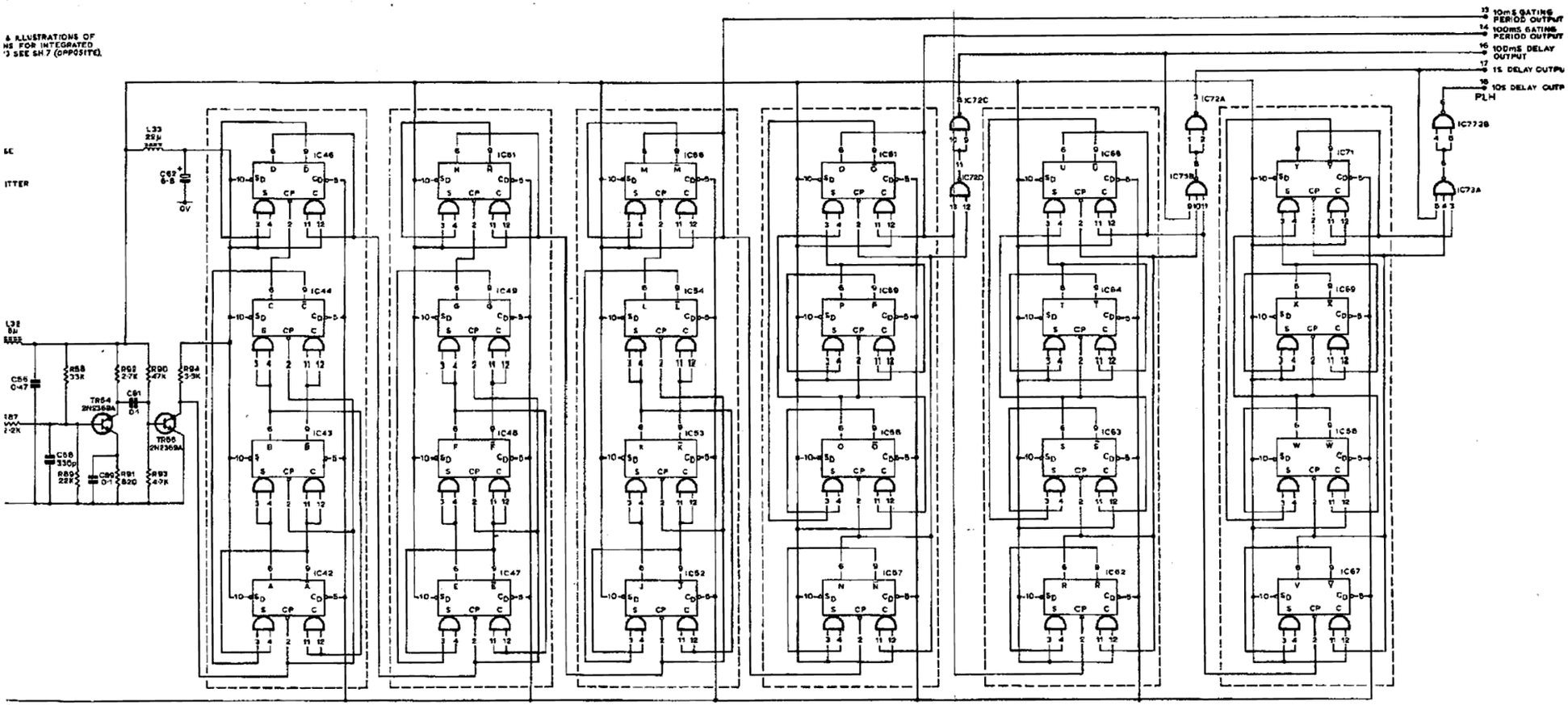
12H DETAIL

N2050 G.P./S.S.B. RECEIVER

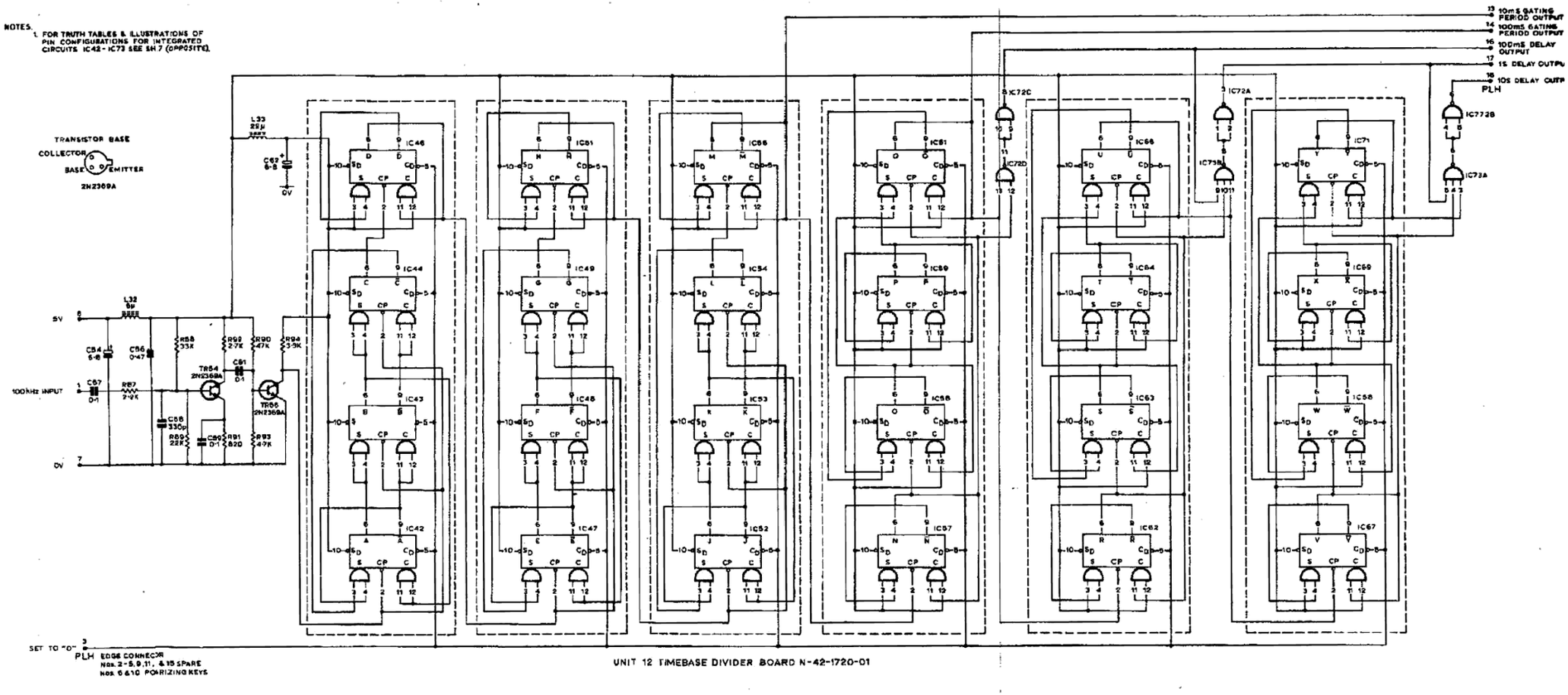
UNIT 12 COUNTER UNIT N-42-1671-01
CIRCUIT.

N-42-1671Z SH7
ISSUE 1

4.91



UNIT 12 TIMEBASE DIVIDER BOARD N-42-1720-01


NOTES.
1. FOR TRUTH TABLES & ILLUSTRATIONS OF PIN CONFIGURATIONS FOR INTEGRATED CIRCUITS IC42 - IC73 SEE SH.7 (OPPOSITE).
TRANSISTOR BASE
COLLECTOR
BASE
EMITTER
2N2369A
100kHz INPUT
5V
0V
SET TO "0"
PLH EDGE CONNECOR
Nos. 2-5, 9, 11, & 15 SPARE
Nos. 6 & 10 POARIZING KEYS
UNIT 12 TIMEBASE DIVIDER BOARD N-42-1720-01
10mS GATING PERIOD OUTPUT
100mS GATING PERIOD OUTPUT
100mS DELAY OUTPUT
1S DELAY OUTPU
10S DELAY OUTP
PLH

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FIRST AID IN CASE OF ELECTRIC SHOCK

The Royal Life Saving Society recommends the **Expired Air** *method of artificial respiration for use in any case of electric shock.* **It is comparatively simple and produces the best and quickest results when correctly applied.** *It also has an important advantage over the accepted manual methods in that* **it can be carried out in awkward situations in confined spaces,** *such as might well be encountered at sea.*

However, where there is a facial injury, or if the patient is trapped in a face downwards position, *it might be necessary to use a manual method of artificial respiration: of this type the* **Holger Nielsen** *method is considered the most satisfactory*

Directions for applying both methods are therefore given.

EXPIRED AIR METHOD OF ARTIFICIAL RESPIRATION

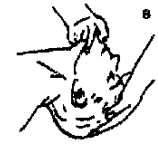
It is essential to commence artificial respiration without delay.

DO NOT TOUCH THE VICTIM WITH YOUR BARE HANDS until the circuit is broken.

SWITCH OFF. If this is not possible, **PROTECT YOURSELF** with dry insulating material and pull the victim clear of the conductor.

1. **Lay the patient on his back** and, if on a slope, have the stomach slightly lower than the chest.

2. **Make a brief inspection of the mouth and throat** to ensure that they are clear of obvious obstruction.



3. **Give the patient's head the maximum backwards tilt** so that the chin is prominent, the mouth closed and the neck stretched to give a clear airway—Fig. A.

4. **Open your mouth wide, make an airtight seal over the nose of the patient and blow.** The operator's cheek or the hand supporting the chin can be used to seal the patient's lips—Fig. B, **or if the nose is blocked,** open the patient's mouth using the hand supporting the chin; open your mouth wide and make an airtight seal over his mouth and blow—Fig. C. This may also be used as an alternative to the mouth-to-nose technique.

5. **After exhaling, turn your head to watch for chest movement** whilst inhaling deeply in readiness for blowing again—Fig. D.

6. **If the chest does not rise, check that the patient's mouth and throat are free of obstruction and the head is tilted backwards as far as possible. Blow again.**

Send for medical assistance if possible.

HOLGER NIELSON METHOD OF ARTIFICIAL RESPIRATION

It is essential to commence artificial respiration without delay.

DO NOT TOUCH THE VICTIM WITH YOUR BARE HANDS until the circuit is broken.

SWITCH OFF. If this is not possible, **PROTECT YOURSELF** with dry insulating material and pull the victim clear of the conductor.

1. Lay patient face downwards with the forehead resting on the hands, placed one above the other.

2. Remove false teeth, tobacco or gum from patient's mouth; make sure the tongue is free by firm blows between the shoulders with the flat of the hand.

3. Kneel on one knee at patient's head, one foot by the patient's elbow.

4. Place palms of your hands on patient's shoulder blades—Fig. A.

5. Rock forward until arms are vertical, the pressure should be light and without force (22–30 lb. is sufficient); this should take 2½ seconds—Fig. B.

6. Release the pressure by allowing the hands to slide down the arms to the patient's elbow (approximately 1 second) then raise the patient's arms and shoulders slightly pulling at the same time by swinging backwards (approximately 2½ seconds)—Fig. C, lower the patient's arms—Fig.D, and return your hands to the patient's shoulder blades.

7. Repeat the movements taking 7 seconds for each complete respiration.

8. **While artificial respiration is continued, have someone else—**

   (*a*) Loosen patient's clothing.

   (*b*) Keep patient warm.

9. **If patient stops breathing, continue artificial respiration.** Four hours or more may be required.

10. **Do not give liquids until patient is conscious.**

Send for medical assistance if possible.

TREATMENT FOR BURNS

1. No attempt should be made to remove clothing adhering to the burn.
2. If other help is available, or as soon as artificial respiration is no longer required, cover the burn with a dry dressing.
3. Oil or grease in any form should not be applied.
4. Warm, weak, sweet tea may be given when the patient is able to swallow.

These instructions are approved by The Royal Life Saving Society. A handbook and charts dealing with Artificial Respiration can be obtained from the Society at 14 Devonshire Street, London, W.1.