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VA-100NC

VIDEO DISTRIBUTION AMPLIFIER

Telecom Serial 347 Item 55

802995

21-10-1991

DESIGNED AND MANUFACTURED
IN AUSTRALIA

VA-100NC

VIDEO DISTRIBUTION AMPLIFIER

INSTRUCTION BOOK

Serial 347 Item 55

WARNING

OPERATION OF ELECTRONIC EQUIPMENT INVOLVES THE USE OF VOLTAGES AND CURRENTS WHICH MAY BE DANGEROUS TO HUMAN LIFE. OPERATING PERSONNEL SHOULD OBSERVE ALL SAFETY REGULATIONS. DO NOT CHANGE COMPONENTS OR MAKE ADJUSTMENTS INSIDE THE EQUIPMENT WITH POWER **ON** UNLESS PROPER PRECAUTIONS ARE OBSERVED. NOTE THAT UNDER CERTAIN CONDITIONS DANGEROUS POTENTIALS MAY EXIST IN SOME CIRCUITS EVEN THOUGH POWER CONTROLS ARE IN THE **OFF** POSITION.

GENERAL DESCRIPTION

The VA-100NC is a D.C. powered Video Distribution Amplifier of modular construction having facilities for cable equalization, longitudinal hum reduction and clamping.

The input is designed to provide a bridging loop impedance over the video bandwidth with respect to 75 ohm. Six 75 ohm D.C. coupled outputs are provided.

The input and output grounds are separated to allow for rejection of longitudinally developed hum.

Cable equalization is provided for up to 300 metres of 75 ohm video cable.

Front panel controls allow the video gain to be varied by a minimum of +/- 3dB, and the cable equalisation to be independently set to compensate for the appropriate length of cable. Internal pre-set controls allow adjustment of the amplifier high frequency response, optimization of the longitudinal hum rejection, and output stage D.C. component.

The VA-100NC is operated from negative 48V D.C.

Equipment provided:-

1	VA-100NC Video Distribution Amplifier
1	Slide Tray
1	RB-1N Rear Assembly

ACCESSORIES AVAILABLE

F-100D	Module Mounting Frame :- Provides mounting for up to 10 VA-100NC amplifiers side by side in 134mm of standard Rack space. (3 Rack Units)
TME-1A	Module Extender: Enables a module to be operated in position and provide access to all circuit boards, transistors and internal adjustments.
RB-1N	Rear Assembly: An additional rear assembly may be purchased to permit bench testing and servicing of the amplifier without disturbing the rear assemblies supplied with the amplifiers.

SPECIFICATIONS

Input power	47 to 53V DC (+ve earthed) @ 125mA in accordance with Telecom Australia Spec 1002.

INPUT CHARACTERISTICS

Input impedance	Bridging loop input with a return loss >40dB to 6MHZ
Input connector	1.6/5.6
Longitudinal hum rejection	>40dB
Maximum level	>2V p-p (0dB gain)

TRANSFER CHARACTERISTICS

Overall gain	>$\pm$ 3dB
High Frequency response	$\pm$ 0.1dB to 10MHz $\pm$ 0.2dB to 20MHz bandwidth exceeds 30MHz
Differential gain	<0.5% at 4.43MHz
Differential phase	<0.5 ^{o} at 4.43MHz
Noise	>70dB 10kHz to 5MHz unified weighted
Operating temperature range	10 ^{o}C - 55 ^{o}C
Cable equalisation	Front panel control equalising up to 300m of 75ohm cable

OUTPUT CHARACTERISTICS

Number	6, dc coupled
Impedance	75ohms, source terminated
Return loss	>40dB to 6 MHz
Overload	3.0V p-p on 4.43MHz sine wave 2.5V p-p on pulse
DC on output	adjustable to 0V
Output Connector	1.6/5.6

FRONT PANEL FACILITIES

* Gain adjustment
* Cable equaliser adjustment
* Clamp on/off indication
* Fuse
* Power on LED

CIRCUIT DESCRIPTION Refer to Drawing no. 802995.

The block diagram shows that the VA-100NC comprises :-

(a) An input stage:- which has a high input impedance to bridge the video source, an equaliser for correction of input coaxial cable losses, and a 75 ohm source terminated output.

(b) A 'plug-in' area: - for accessories not yet defined. Link 2 bypasses this feature.

(c) An output stage:- with 6 75 ohm source terminated outputs. This stage may have its black level clamped to 0V by placing LK1 in the 'On' position.

(d) Clamp logic:- a sync separator and back porch sample pulse generator is fed from the output of the Input stage. Video from the output of the Output stage is firstly low pass filtered (to remove chroma and noise) and then applied to a sample switch. This switch, under control of the sample pulse stores in a sample and hold capacitor the back porch error signal. If LK1 is in the 'On' position this error is applied to the inverting input of the Output stage to correct the offset.

(e) Power Supply:- the -48V DC input voltage is fed via an on board fuse to a DC-DC converter. The output of the converter is + and - 15V. These supplies are further regulated to + and - 12V by 3 terminal regulators. The LED on the front panel is wired in series with a zener diode between +12 and -12 Volts. The zener is to ensure that the LED extinguishes if any one of the regulators fails.

	Video Clamp	
LK1	On	Off
	enables back porch clamp	disables back porch clamp

	Accessories	
LK2	Inserted	Removed
	by-passes accessories	accessories can be inserted

INSTALLATION

The VA-100NC is supplied with a slide tray, rear assembly and associated hardware, for mounting in an F-100D frame.

Slide Tray

The slide tray is a shallow tray which supports the amplifier in the frame. It is mounted on the front and rear cross members of the frame and is fixed in place with steel clips (speed nut type) provided.

Rear Assembly

The rear assembly is mounted on the rear of the frame with the screws provided. Care should be taken not to over tighten these screws, as excessive force will damage the thread in the mounting frame.

Signal Connections

Signal connections are made via coaxial connectors mounted on the rear assembly. The input loop, if not used should be terminated in 75 ohm as should any unused outputs of the amplifier.

SETTING UP PROCEDURE

The amplifier should be set up in the position in which it is intended to be operated. Adjustments can then be made using the intended lengths of cable and with all outputs terminated as they would be in service.

The cable equalizing should be set to its minimum and the gain control adjusted to give the required low frequency gain. Using a suitable test signal, such as pulse and bar, multiburst or sweep, the cable equalization can be advanced to compensate for input cable losses.

It should be noted that the equalizers are factory set to match Belden type 8281 75 ohm cable.

Whilst for short runs this equalizer will be satisfactory for most 75 ohm solid dielectric cables, for longer runs of some cables the equalizer may have to be reset (a factory adjustment) or replaced with a specially designed module.

If backporch clamping is required LK1 should be put in the 'Clamp On' position and the Clamp On LED on the front panel

should illuminate. If clamping is not required LK1 should be in the 'Clamp Off' position.

MAINTENANCE

Once having been adjusted the Video Distribution Amplifier will need little attention. It is wise however to occasionally check the adjustments as described earlier. This will also be necessary after a component has been replaced.

Most faults can be readily traced by checking the D.C. voltages at various points in the circuit. The table of voltages given in this book can be used as a guide but deviations sometimes in the vicinity of +/-1 volt can be expected in some units. The voltages should be checked starting from the input as the D.C. conditions of the whole amplifier are set in the first stage, thus a fault early in the circuit will cause errors at the output.

Internal Adjustments

The following adjustable resistors and capacitors are factory set and should not be adjusted unless a component has been changed. They are not 'operational' controls. Before adjusting any of these controls allow time for the VA-600 to reach temperature stability.

RV3 Hum:-
Adjusted to best cancel hum on the input cable. The clamp must not be in operation during this adjustment.

RV1 DC Offset:-
With no input signal applied RV1 is used to set the junction of R12 R14 to zero volts.

C2 Freq Resp:-
Used to set the frequency response of the input stage to maximal flatness when observed at the junction of R12 R14.

RV4 DC Offset:-
With no input signal and with LK1 installed and after adjustment of RV1, RV4 can be adjusted so that the junction of R29 R30 is zero volts.

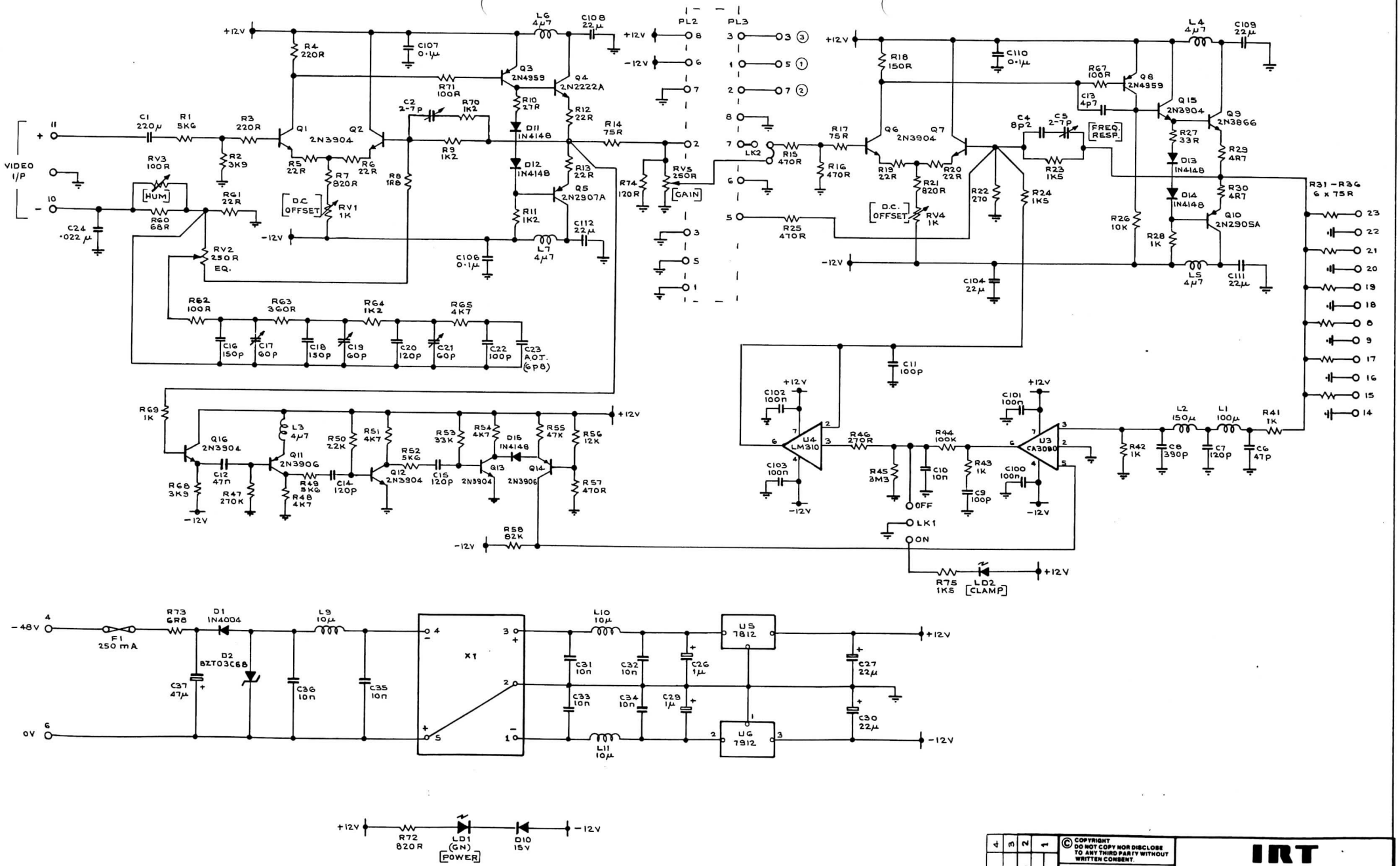
C5 Freq Resp:-
Used to set the frequency response of the output stage. Maladjustment of this capacitor can cause instability in the amplifier under extreme conditions.

TABLE OF VOLTAGES

Q	Emitter	Base	Collector
1	-0.72	~0	11.2
2	-0.66	~0	12
3	12	11.3	0.82
4	0.24	0.82	12
5	-0.25	-0.85	-12
6	-0.67	~0	11.3
7	-0.66	~0	12
8	12	11.3	1.65
9	0.3	0.98	12
10	-0.2	-0.85	-12
11	1.03	12.6	12
12	0	0.67	0.21
13	0	0.67	0.26
14	0.6	0.46	-11.97
15	0.98	1.65	12
16	-0.68	~0	12

U	1	2	3	4	5	6	7	8
3	~0	0	~0	-12	-11.9	-0.5	12	-0.14
4	11.94	0	0	-12	-11.65	0	12	11.94
5	15	0	12					
6	0	-15	-12					

All voltages measured with a high input impedance multimeter under conditions of unity gain. All voltages are measured with respect to earth. Supply voltage is -50.0V D.C. Test signal is 1V P-P composite Stair Step and the Clamp is off.



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22-4-91	7-1-91	18-12-90	ORIGINAL ISSUE	DATE 17-9-90

DRAWN B.A.S. DATE
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ENG. APP

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MM FRACTIONS DECIMALS ANGLES

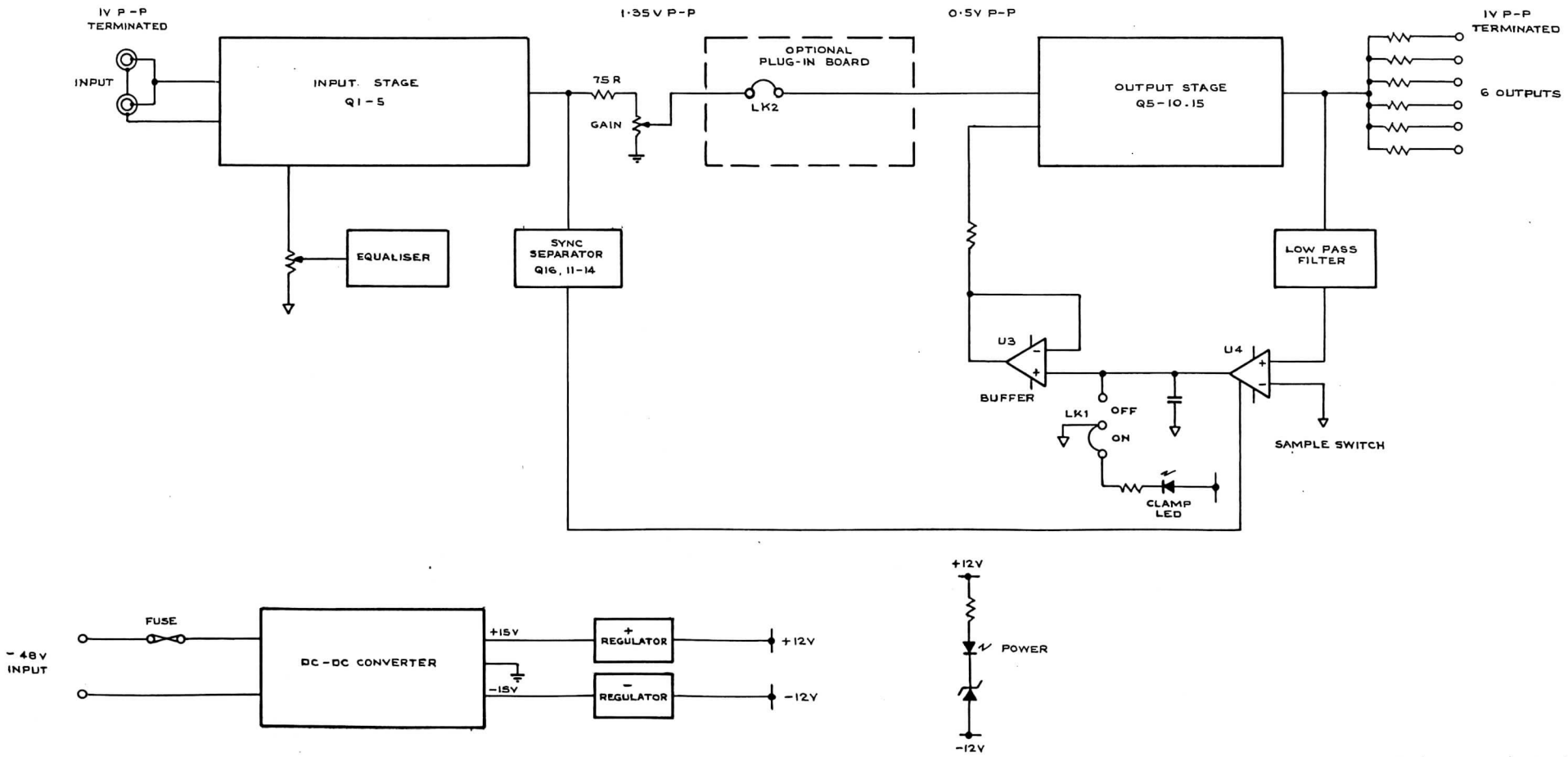
IRT

TITLE VA-100NC VISION DISTRIBUTION AMPLIFIER

SIZE SCALE

CONTRACT NO. DRAWING NO 802995 SHEET 1 OF 3

IRT Electronics Pty Ltd
26 Hothern Pde Artarmon, Australia 2064



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DATE	28-10-91
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TITLE	VA-100NC BLOCK DIAGRAM
SIZE	
SCALE	
CONTRACT NO	
DRAWING NO	802995
SHEET	2 of 3

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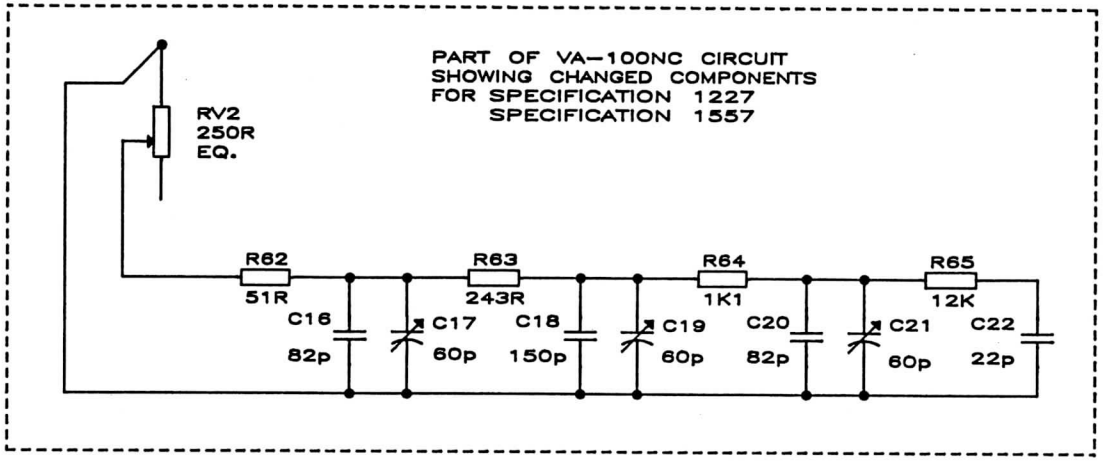

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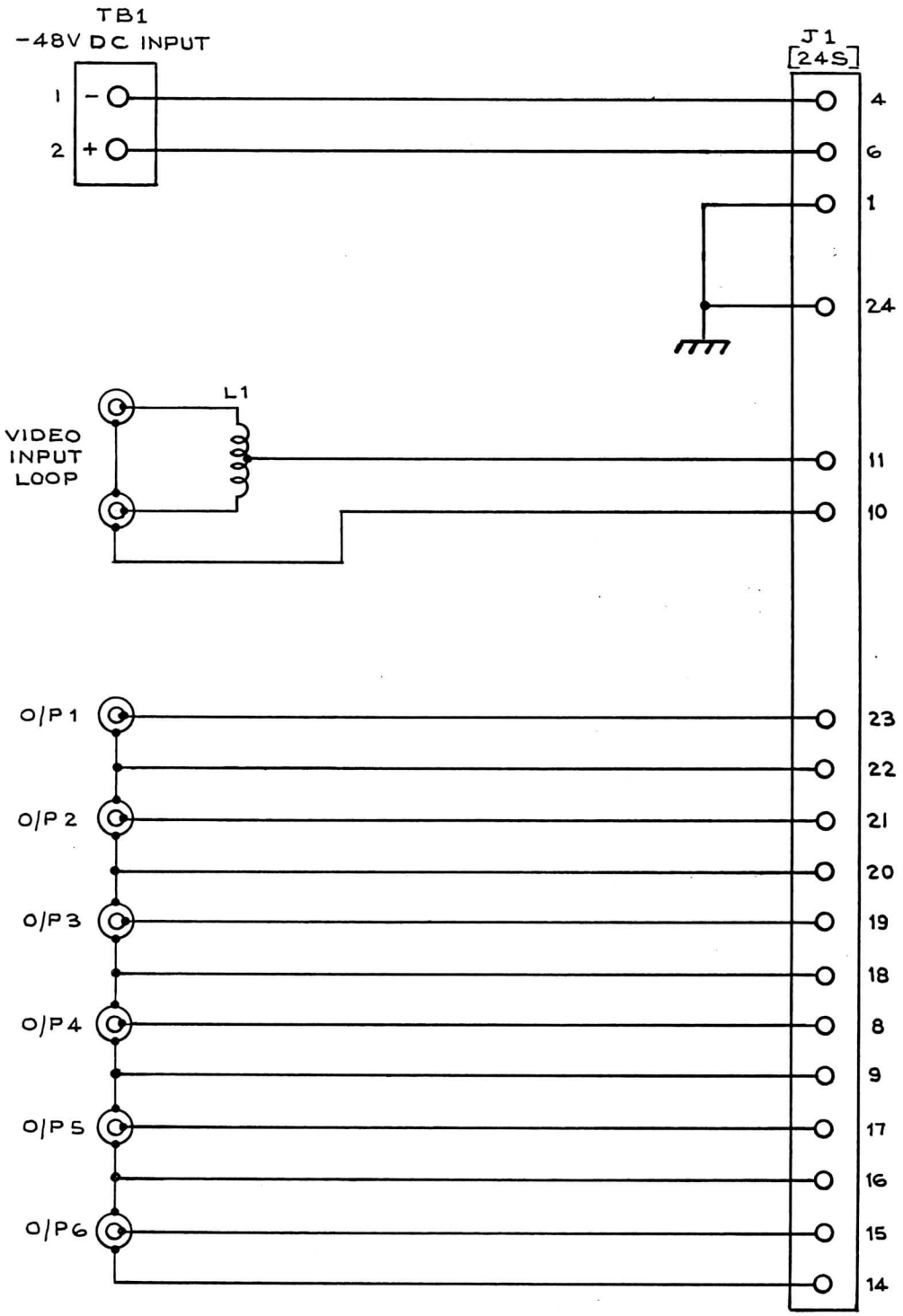
	CHECKED	SCALE	DRAWING No. 802995	SHEET 3 OF 3
	ENG. APP.			
	CONTRACT No.	IRT Electronics Pty. Ltd. ARTARMON NSW AUSTRALIA 2064		



USE WITH

VA-100N	
VA-132N	

ORIGINAL ISSUE 2
DATE 12.3.84

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UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN MM
FRACTIONS DECIMALS ANGLES
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IRT

TITLE
RB-1N
REAR ASSY.

SIZE | SCALE :

CONTRACT NO.

DRAWING NO. 801180

SHEET 1 OF 2

IRT
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26 Hotham Pde., Artarmon, Australia 2064

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Replacement Parts List **802995 VIDEO DISTRIBUTION AMPLIFIER ASSEMBLY VA-100NC** Page 1 of 4

Part No.	Description.	Qty	Cct Ref.	Sup
PC802994	PCB VA-100NC	1		120
SFR16T-1R8	RESISTOR METAL FILM .25W 5%	1	R8	58
SFR16T-4R7	RESISTOR METAL FILM .25W 5%	2	R29,30	58
SFR16T-22R	RESISTOR METAL FILM .25W 5%	7	R5,6,12,13,19,20,61	58
SFR16T-27R	RESISTOR METAL FILM .25W 5%	1	R10	58
SFR16T-33R	RESISTOR METAL FILM .25W 5%	1	R27	58
SFR16T-68R	RESISTOR METAL FILM .25W 5%	1	R60	58
SFR16T-75R	RESISTOR METAL FILM .25W 5%	2	R14,17	58
SFR16T-100R	RESISTOR METAL FILM .25W 5%	2	R62,67	58
SFR16T-120R	RESISTOR METAL FILM .25W 5%	1	R74	58
SFR16T-150R	RESISTOR METAL FILM .25W 5%	1	R18	58
SFR16T-220R	RESISTOR METAL FILM .25W 5%	2	R3,4	58
SFR16T-270R	RESISTOR METAL FILM .25W 5%	3	R22,46,71	58
SFR16T-360R	RESISTOR METAL FILM .25W 5%	1	R63	58
SFR16T-470R	RESISTOR METAL FILM .25W 5%	4	R15,16,25,57	58
SFR16T-820R	RESISTOR METAL FILM .25W 5%	3	R7,21,72	58
SFR16T-1K	RESISTOR METAL FILM .25W 5%	5	R28,41-43,69	58
SFR16T-1K2	RESISTOR METAL FILM .25W 5%	4	R9,11,64,70	58
SFR16T-1K5	RESISTOR METAL FILM .25W 5%	3	R23,24,75	58
SFR16T-3K9	RESISTOR METAL FILM .25W 5%	2	R2,68	58
SFR16T-4K7	RESISTOR METAL FILM .25W 5%	4	R48,51,54,65	58
SFR16T-5K6	RESISTOR METAL FILM .25W 5%	3	R1,49,52	58
SFR16T-10K	RESISTOR METAL FILM .25W 5%	1	R26	58
SFR16T-12K	RESISTOR METAL FILM .25W 5%	1	R56	58
SFR16T-22K	RESISTOR METAL FILM .25W 5%	1	R50	58
SFR16T-33K	RESISTOR METAL FILM .25W 5%	1	R53	58
SFR16T-47K	RESISTOR METAL FILM .25W 5%	1	R55	58
SFR16T-82K	RESISTOR METAL FILM .25W 5%	1	R58	58

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Replacement Parts List **802995 VIDEO DISTRIBUTION AMPLIFIER VA-100NC**

Part No.	Description.		Qty	Cct Ref.	Sup
SFR16T-100K	RESISTOR METAL FILM .25W 5%		1	R44	58
SFR16T-270K	RESISTOR METAL FILM .25W 5%		1	R47	58
RMF255-3M3	RESISTOR METAL FILM .25W 5%		1	R45	58
RMF251-75R	RESISTOR METAL FILM .25W 1%		6	R31-36	92
ASW-2-6R8	RESISTOR WIRE WOUND 2W		1	R73	
WA2G024S251U	RESISTOR VARIABLE 250R		2	RV2,5	
3329H-101	RESISTOR VARIABLE 100R		1	RV3	
3329H-102	RESISTOR VARIABLE 1K		2	RV1,4	
CC4P7	CAPACITOR CERAMIC 4.7pF		1	C13	
CC8P2	CAPACITOR CERAMIC 8.2pF		1	C4	58
CC47P	CAPACITOR CERAMIC 47pF		1	C6	58
CC100P	CAPACITOR CERAMIC 100pF		3	C9,11,22	58
CC120P	CAPACITOR CERAMIC 120pF		4	C7,14,15,20	58
CC150P	CAPACITOR CERAMIC 150pF		2	C16,18	58
CC390P	CAPACITOR CERAMIC 390pF		1	C8	58
CC10N	CAPACITOR CERAMIC 10nF		5	C10,31,32,33,34	51
CC22N	CAPACITOR CERAMIC 22nF		1	C24	58
CC47N	CAPACITOR CERAMIC 47nF		1	C12	
CC100N	CAPACITOR CERAMIC 100nF	(Z5U)	7	C100-103,106,107,110	
CP10N/63V	CAPACITOR POLY 10NF 63V		2	C35,36	
TT1/35	CAPACITOR TAG TANT 1uF/35V		2	C26,29	
TT22/16	CAPACITOR TAG TANT 22uF/16V		7	C27,30,104,108,109,111,112	
RT47/63	CAPACITOR ELECTRO 47uF/63V		1	C37	81
RB220/16	CAPACITOR ELECTRO 220uF/16V		1	C1	81
TZ032070E	CAPACITOR VARIABLE 2-7pF	(BLUE)	2	C2,5	51
TZ03P600E	CAPACITOR VARIABLE 10-60pF	(BROWN)	3	C17,19,21	51

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Replacement Parts List **802995 VIDEO DISTRIBUTION AMPLIFIER VA-100NC**

Part No.	Description.	Qty	Cct Ref.	Sup
1N4148	DIODE 75V 100mA	5	D11-15	81
1N4004	DIODE POWER 1A	1	D1	81
BZT03C68	DIODE ZENER 68V	1	D2	51
BZX79C15	DIODE ZENER 15V	1	D10	51
LEDGN5MM	LED GREEN	2	LD1,2	51
2N3904	HF TRANS TO-92 NPN	8	Q1,2,6,7,12,13,15,16	97
2N3906	HF TRANS TO-92 PNP	2	Q11,14	97
2N2222	HF TRANS TO-18 NPN	1	Q4	97
2N2905	HF TRANS TO-39 PNP	1	Q10	97
2N2907	HF TRANS TO-18 PNP	1	Q5	97
2N4959	RF TRANS TO-18 PNP	2	Q3,8	97
2N3866	RF TRANS TO-39 NPN	1	Q9	97
7812	IC REGULATOR 12V 1A	1	U5	97
7912	IC REGULATOR -12V 1A	1	U6	97
CA3080	OPERATIONAL TRANSCOND AMP	1	U3	54
LM310N	OP AMP BUFFER	1	U4	81
UM915	DC/DC CONVERTER 48/2x15	1	X1	81
IM-2 4.7	INDUCTOR 4.7uH	5	L3-7	54
IM-2 10	INDUCTOR 10uH	3	L9,10,11	54
IM-2 100	INDUCTOR 100uH	1	L1	54
IM-2 150	INDUCTOR 150uH	1	L2	54
26-4100-24P	CONNECTOR 24 PIN	1	PL1	
1100-1-124-03	PC HEADER	.66	PL2,3	99
	PC HEADER (GOLD)	.12	LK1	99
ZTMJB505	SHORTING LINKS 30u GOLD	1		99
2270B	HEATSINK	2		81

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Replacement Parts List **802995 VIDEO DISTRIBUTION AMPLIFIER VA-100NC**

Part No.	Description.	Qty	Cct Ref.	Sup
E803183	ESCUTCHEON	1		62
W3108T	IC SOCKET 8 PIN	2		99
L1426	OPEN FUSE HOLDER (PCB)	1		
20x5 .250	FUSE 250mA	1		
SL48	LED HOLDER	2		1
021-1220	KNOB BLACK WITH LINE	2		62
040-1620	CAP BLACK WITH LINE	2		99
5022	CO-AXIAL CABLE	.3		
801576	HANDLE S/W	1		
800028	COVER S/W MODULE	1		
800029	FRAME S/W MODULE	1		1
801775	SIDE COVER	1		1
SBV1700/14/16	BRASS STUD	1		1
SNU/0520/17/4	"U" NUTS	1		1

I.R.T. ELECTRONICS PTY.LTD.

Replacement Parts List **801180 REAR ASSEMBLY RB-1N ISSUE 2**

Part No.	Description.	Qty	Cct Ref.	Sup
26-4200-24S	CONNECTOR 24 PIN S	1	J1	54
AC40334-A76-A14	CONNECTOR COAXIAL 1.5/6	8		86
25.106.0253	TERMINAL BLOCK	1	TB1	61
PC801957	PCB I/P LOOP COMP	1	L1	68
PC801171	REAR PLATE RB-1N	1		26
800319	CHASSIS REAR ASSY S/W	1		26
800320	SIDE PLATE REAR ASSY	1		26
CAP SCREW 4BA	SCREW ALLEN HEAD 4BA BLK	2		4