I.R.T. ELECTRONICS PTY LTD
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VA-141A

8x1 VIDEO SWITCHER

8Ø11Ø1

15-Ø7-1981

DESIGNED AND MANUFACTURED
IN AUSTRALIA

VA-141A

8x1 VIDEO SWITCHER

INSTRUCTION BOOK

W A R N I N G

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.

8Ø11Ø1

SPECIFICATIONS

Input Power	220V - 260V AC 50Hz.

VIDEO INPUT CHARACTERISTICS

Input Impedance	Bridging loop input AC coupled
Number of Inputs	8
Input Connector	B.N.C.
Input Signal	Composite or non-composite

TRANSFER CHARACTERISTICS

Overall Gain	Set to 0dB
Frequency Response	$\pm$0.2dB to 10MHz (0.5V P-P sweep signal).
Differential Phase at 4.43MHz	Less than 0.5^{o} at 1V P-P (using Tektronix 141 Signal Generator at 50% APL)
Differential Gain on 4.43MHz	Less than 0.5% at 1V P-P (using Tektronix 141 Signal Generator at 50% APL)
Crosstalk	Less than -60dB at 4.43MHz

VIDEO OUTPUT CHARACTERISTICS

Number of Outputs	2 - DC coupled.
Output Impedance	75ohm
Output Connector	B.N.C.

CONTROL

Switching Time	During the vertical interval, Timing is derived from the output video or from input 8 as selected by LK1 and LK2 respectively on the VA-141 P.C. Board. The VA-141 comes strapped with LK1 and thus always switches out during the vertical interval of the "on air" video.

SPECIFICATIONS (CONT.)

CONTROL (Cont.)

Switch Control Tally	Monentary ground Provision for driving 12V X 50mA lamps if internal power supply used. Tally output will sink up to 50mA with a maximum off voltage of 28V. Control and Tally are available on the rear via 20 pin Edac connector.

MECHANICAL

19" rack mounting chassis one rack unit high.

ORDERING INFORMATION

VA-141A 8 X 1 Video switcher includes 20 pin Edac connector

INSTRUCTION BOOK

Optional

CIRCUIT DESCRIPTION

There are eight identical video input circuits. Each video input comprises two BNC connectors to allow looping connections. If looping is not required, the unused connector should be terminated in 75ohm.

Q1 and Q2 are a complimentary pair of emitter followers. VR1 is used to set the DC at Q2 emitter to OV.

Q3 is a common base circuit, utilised as a switch. When the input is not switched to the output, the output of U7 is "high". This allows the base of Q3 to rise to approximately +2.9V, whilst its emitter is at OV, effectively cutting it off. When the output is U7 goes "low", the positive potential is removed from Q3 base and it therefore saturates.

Q25 to Q29 form a two output amplifier with a gain of approximately 2 times. C26 adjusts the frequency response. The output of this amplifier is DC coupled, hence the necessity for the DC set controls (VR1).

Q33 and Q34 form a multi vibrator, running a little slower than 50Hz. In the absence of triggers from Q32, the "free running" ability of Q33 and 34 ensure that switching can still occur, although it will not necessarily be during vertical interval.

The video input from the output amplifier or input 8 signal as selected by LK1 or LK2 is fed via emitter follower Q30 to the Sync separator Q31. Q32 in conjunction with C34 derives a trigger during vertical block, which is used to synchronise the monostable Q33, Q34 via D3.

The "low" going transition from Q34 collector is differentiated by C41, R109 and triggers Mono U1. The duration of this Mono is set by RV10 and is set so that its trailing edge occurs during line 9. C45 and R111 differentiate this edge and trigger Mono U2 whose output pulse is approximately 1 us wide. As U2 output is a 12V swing it is divided by R113, R114 to approximately 4V to be compatable with the TTL logic that follows.

CIRCUIT DESCRIPTION (CONT.)

U4 is a "Priority Encoder". Its outputs on pins 9, 7 and 6 will be the binary code of the number of the highest numbered input which is grounded. (e.g. Input 0 grounded - binary code = 000 or Input 7 grounded - binary code = 111). Also whenever any input to U4 is grounded, its pin 15 will go "high", enabling the pulses from U2 to be routed via the gate and inverter U3, to U5 pins 4 and 13. U5 is used as a 4 bit latch and retains on its outputs the information that was present on its inputs at the time when its pins 4 and 13 were "high". These outputs are applied to two "one of eight decoders" U6 and U7. U7 decodes the binary information on its input to send one of its outputs "low" thus turning on the appropriate video input. U6 performs a similar function but is used to drive tally lamps or relays external to the unit.

WARNING. - if external voltage is used to drive these lamps or relays then to prevent damage to U6 this voltage must be removed whenever the VA-141 is turned off. The maximum external voltage that can be used is +28V, maximum load 50mA.

The power supply comprises three bridge rectifier circuits and three fixed voltage regulators to give the +12, -12 and +5 volts required by the switcher.

$\pm$12V is provided on pins A and M (L,GND) of the control connector to power the AA-189 Audio follow switcher and/or the remote lamps on the IRT VA-179 remote switcher control panel.

EXTENDED OPERATION

Two VA-141A switchers may be linked together and used as a 15 X 1 or 16 X 1 switcher.

15 X 1 OPERATION

Use a small connector on the rear panel to connect the P.C. board connections A, B and C as follows:

Point	A	to	B
"	B	to	A
"	C	to	C

Wire output of switcher 1 to input 8 of switcher 2. On switcher 2 cut link 3 on the P.C. board. Switcher 2 sources the output video. For vertical interval switching at all times, on switcher 1 cut Link 1 and complete Link 2. This locks the switch pulse of switcher 1 to input 8 video of switcher 1. Switcher 2 switch pulse remains locked to output video, this may be locked to its input 8 video as above if desired.

16 X 1 OPERATION

Use a small connector on the rear panel to connect the P.C. board connections A, B and C as follows:

Point	A	to	B
"	B	to	A
"	C	to	C

Use a coax connector on the rear panels to connect the switched video lines of the two switchers together. P.C. board connections are available near R81. Both switchers will source output video.

GENERAL DESCRIPTION

The VA-141A is an eight input video switcher intended for general switching and monitoring in a TV studio

Major features of the VA-141A switcher are:

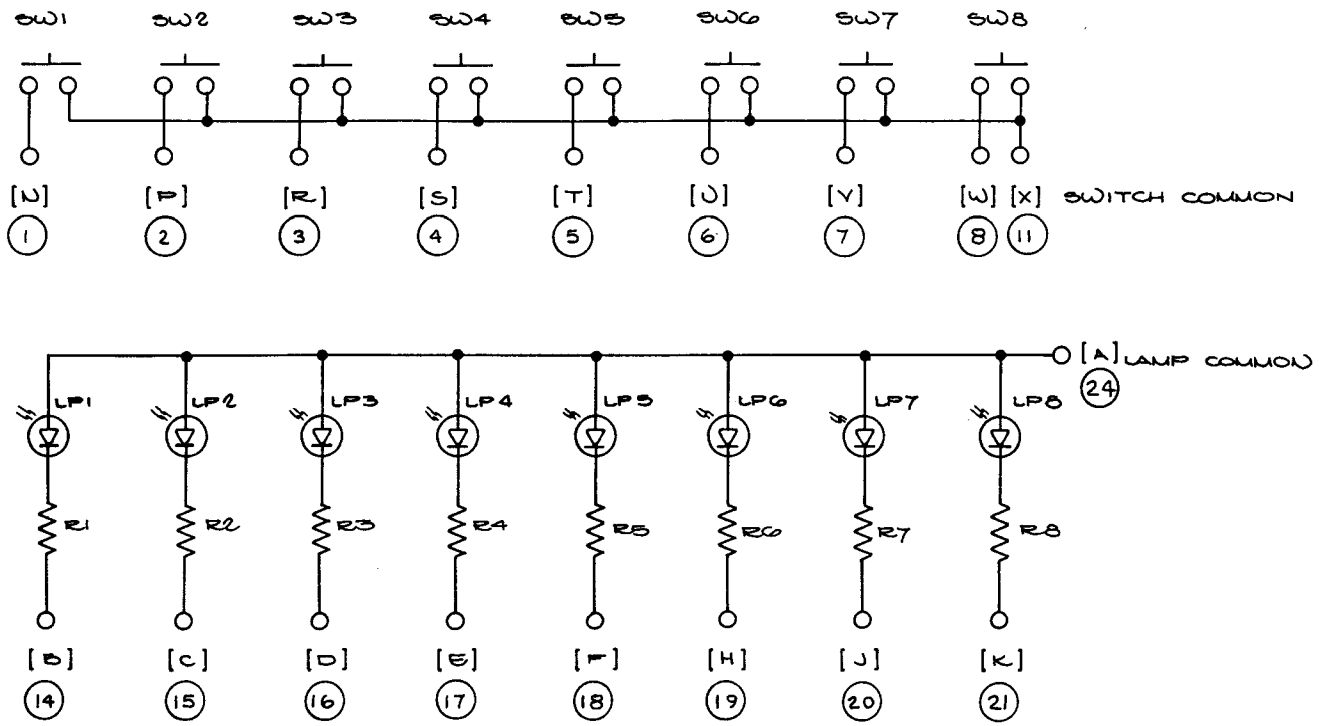
* Small size 19" rack mounting, one rack unit high.
* Vertical interval switching.
* Momentary push button control.
* Circuit provision for link in two switchers for 15 X 1 or 16 X 1 switching.
* Provision for audio follow switching using the tally lines.

Options available are:

VA-179 remote control panel.
This one rack unit high panel interfaces with SKA on the VA-141A. The VA-179 uses the same switch board as the VA-141A and allows remote selection of the VA-141A inputs.

AA-189 8 X 1 Audio Switcher
The AA-189 is an 8 X 1 relay switcher which includes an active audio amplifier. This gives a bridging input balanced audio switcher with one 600 ohm balanced output circuit. The AA-189 can be powered from the $\pm$12V supply voltages internal to the VA-141A. Mounting of the AA-189 is in the F-100D Module Mounting Frame.

H or V split of inputs 1 to 7 against input 8 provided by selection on a front panel switch, either a vertical or horizontal split between input 8 and other input. The split is maintained for the period that the control lines of 8 and the selected input is held permanently to earth. The H and V inputs are via terminating 75 ohm inputs on the rear of the unit.



NOTES : FOR +12V LAMP COMMON RESISTORS 1K Ω

[ ] WIRING DETAILS FOR EDAC CONNECTOR

◯ WIRING DETAILS FOR 25 PIN 'D TYPE' CONNECTOR.
[USE P.C. BOARD 801832]

27-8-82 2

ORIGINAL ISSUE 1

DATE 16-9-81

DRAWN DATE

TAPED

CHECKED

ENG. APP

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MM FRACTIONS DECIMALS ANGLES

IRT

TITLE AA-179 8x1 SWITCH PANEL

SIZE SCALE :

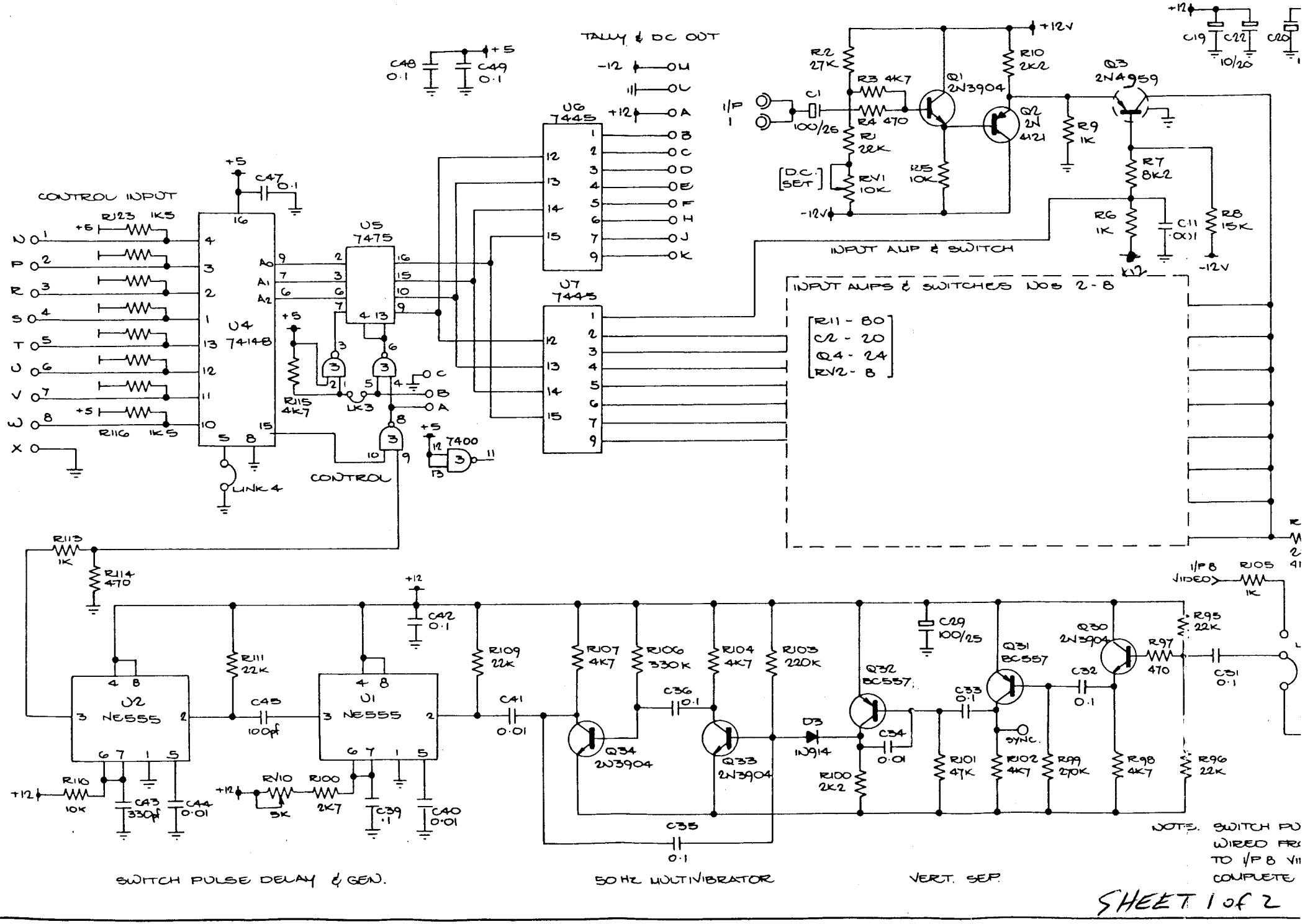
CONTRACT NO.

DRAWING NO. 801590

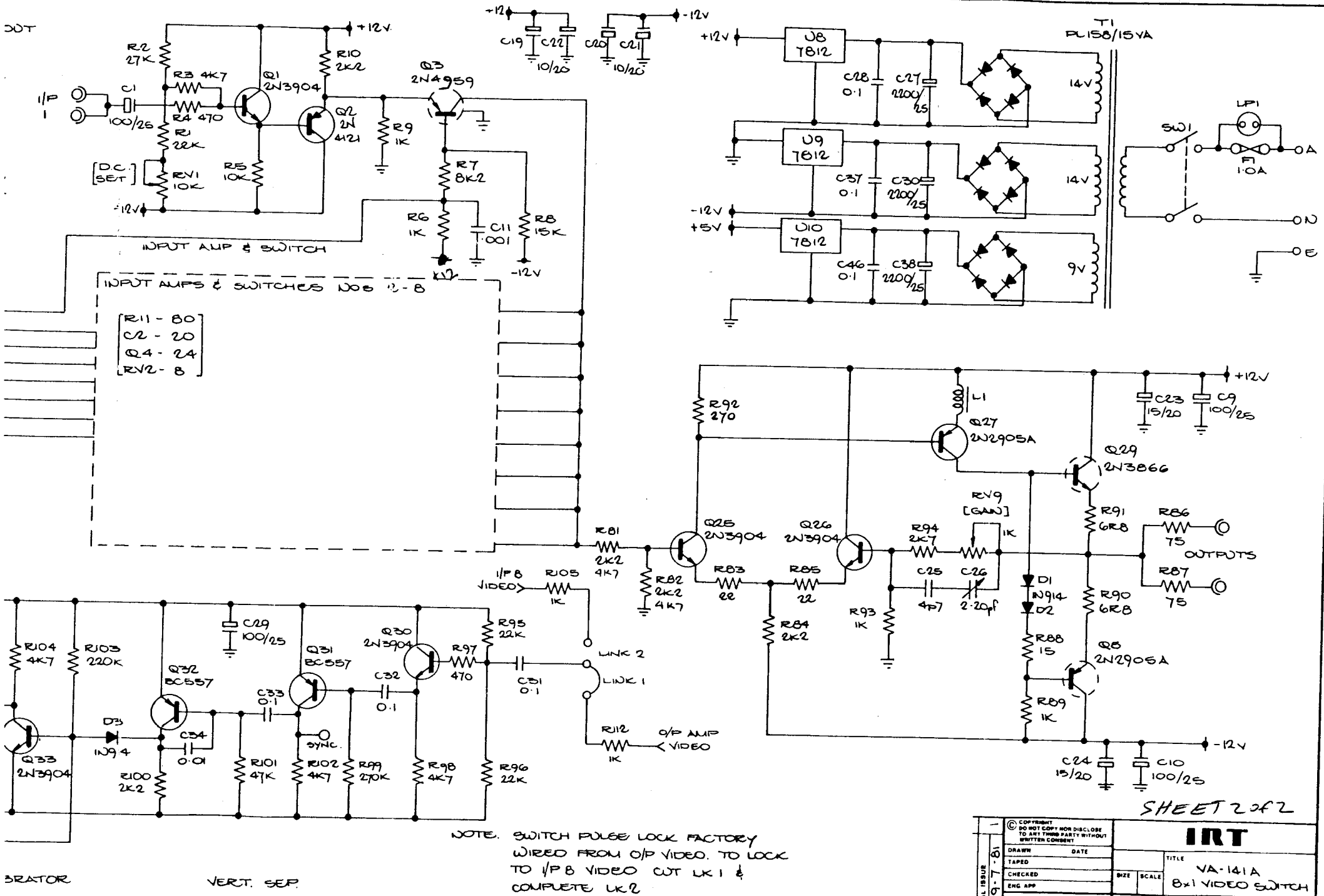
SHEET OF

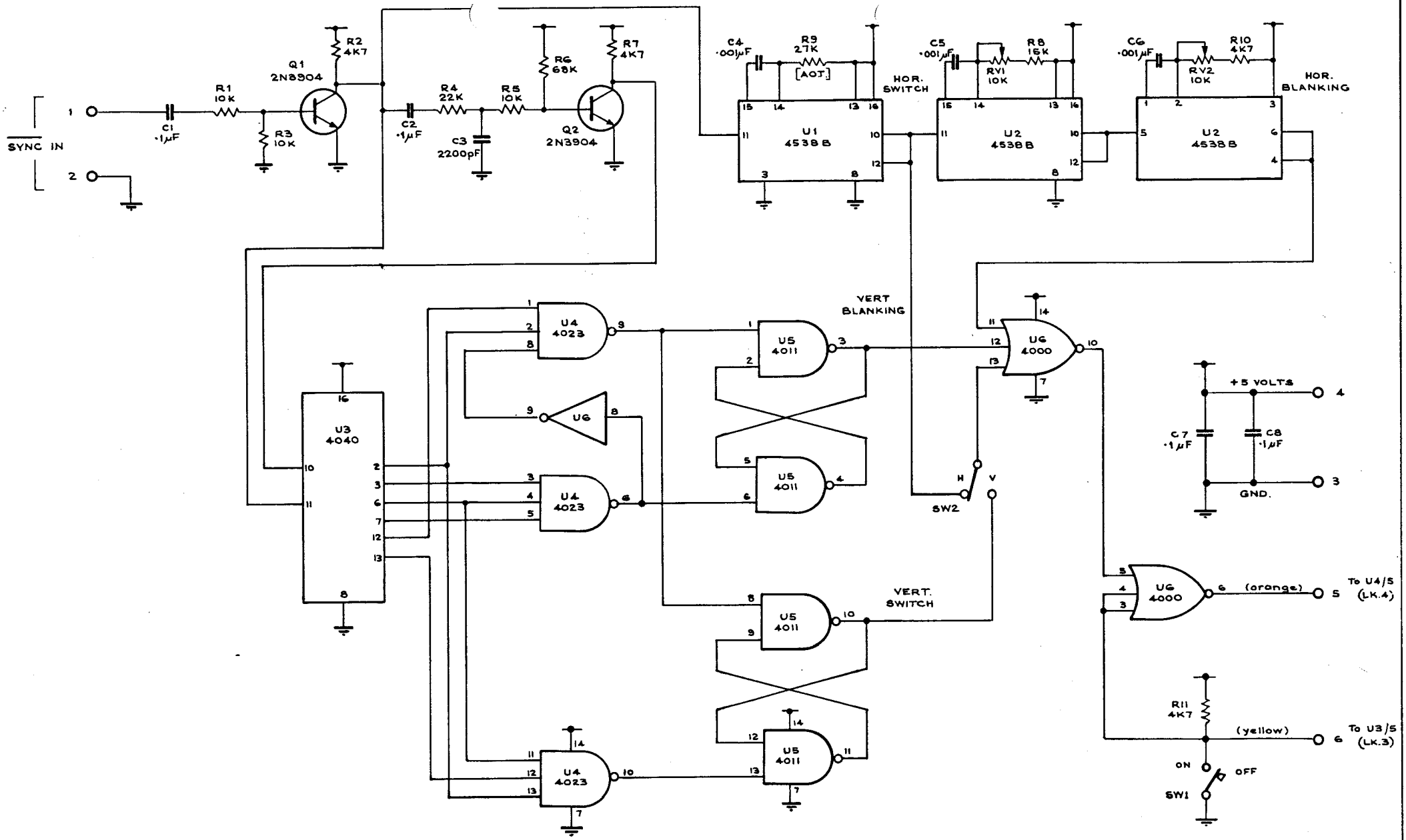
IRT

I.R.T. Electronics Pty. Ltd.
26 Hotham Pde. Artarmon Australia 2064


TALLY & DC OUT
CONTROL INPUT
INPUT AMP & SWITCH
INPUT AMPS & SWITCHES NOS 2-8
R11 - 80
C2 - 20
Q4 - 24
RV2 - 8
U4 7414-8
U5 7475
U6 7445
U7 7445
U2 NE555
U1 NE555
7400
Q1 2N3904
Q2 2N 4121
Q3 2N4959
Q30 2N3904
Q31 BC557
Q32 BC557
Q33 2N3904
Q34 2N3904
D3 1N914
LK2
LK3
LINK 4
CONTROL
SYNC.
1/P VIDEO
SWITCH PULSE DELAY & GEN.
50 Hz MULTIVIBRATOR
VERT. SEP.
NOTE: SWITCH PU
WIRED FR
TO 1/P B VI
COMPLETE

SHEET 1 of 2


+12V
-12V
R2 27K
R3 4K7
R4 470
R1 22K
C1 100/25
1/P 1
Q1 2N3904
Q2 2N 4121
Q3 2N4959
R10 2K2
R9 1K
R7 8K2
R6 1K
C11 .001
R8 15K
R5 10K
RV1 10K
D.C. SET
INPUT AMP & SWITCH
INPUTS & SWITCHES NOS 2-8
R11 - 80
C2 - 20
Q4 - 24
RV2 - 8
C19 C22 10/20
C20 C21 10/20
U8 7812
U9 7812
U10 7812
C18 0·1
C27 2200/25
C37 0·1
C30 2200/25
C46 0·1
C38 2200/25
14V
14V
9V
T1 PL158/15VA
SW1
LP1
1·0A
A
N
E
R92 270
L1
Q27 2N2905A
Q29 2N3866
C23 15/20
C9 100/25
RV9 [GAIN]
1K
R94 2K7
R91 6R8
R86 75
OUTPUTS
R87 75
R90 6R8
D1 IN914
D2
R88 15
Q8 2N2905A
R89 1K
C24 15/20
C10 100/25
R81 2K2 4K7
Q25 2N3904
Q26 2N3904
R82 2K2 4K7
R83 22
R85 22
R84 2K2
R93 1K
C25 4p7
C26 2·20pf
1/P 8 VIDEO
R105 1K
LINK 2
LINK 1
R112 1K
O/P AMP VIDEO
R104 4K7
R103 220K
Q32 BC557
C29 100/25
Q31 BC557
Q30 2N3904
R95 22K
R97 470
C31 0·1
C32 0·1
C33 0·1
C34 0·01
D3 IN914
Q33 2N3904
R100 2K2
R101 47K
R102 4K7
R99 270K
R98 4K7
R96 22K
SYNC.
BRATOR
VERT. SEP.
NOTE. SWITCH PULSE LOCK FACTORY WIRED FROM O/P VIDEO. TO LOCK TO 1/P 8 VIDEO CUT LK 1 & COMPLETE LK 2
SHEET 2 of 2
IRT
VA-141A 8x1 VIDEO SWITCH
801101
ORIGINAL ISSUE DATE 19-7-81



ORIGINAL ISSUE	© COPYRIGHT DO NOT COPY NOR DISCLOSE TO ANY THIRD PARTY WITHOUT WRITTEN CONSENT	IRT
DATE 2-11-83	DRAWN BAS DATE	TITLE VA-141 OPT. 2 H-V SPLIT OPTION
	TAPED	
	CHECKED	SIZE SCALE
	ENG. APP.	
	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MM FRACTIONS DECIMALS ANGLES	CONTRACT NO DRAWING NO 802000 SHEET OF
		IRT Electronics Pty Ltd 26 Hotham Pde. Artarmon. Australia 2064

I.R.T. ELECTRONICS PTY.LTD.

Replacement Parts List **VA-141A 8 X 1 VIDEO SWITCHER 8Ø11Ø1 ISSUE**

Part No.	Description.	Qty	Cct Ref.	Sup
RMF255-6R8	RESISTOR METAL FILM .25W 5%	2	R9Ø,91	92
RMF255-15R	RESISTOR METAL FILM .25W 5%	1	R88	92
RMF255-22R	RESISTOR METAL FILM .25W 5%	2	R83,85	92
RMF255-27ØR	RESISTOR METAL FILM .25W 5%	1	R92	92
RMF255-47ØR	RESISTOR METAL FILM .25W 5%	1Ø	R4,14,24,34,44,54,64,74,97,114	92
RMF255-1K	RESISTOR METAL FILM .25W 5%	21	R6,9,16,19,26,29,36,39,46,49,56,	92
			R59,66,69,76,79,89,93,1Ø5,112,113	92
RMF255-1K5	RESISTOR METAL FILM .25W 5%	8	RR116-123	92
RMF255-2K2	RESISTOR METAL FILM .25W 5%	1Ø	R1Ø,2Ø,3Ø,4Ø,5Ø,6Ø,7Ø,8Ø,84,1ØØ	92
RMF255-2K7	RESISTOR METAL FILM .25W 5%	2	R94,1Ø8	92
RMF255-4K7	RESISTOR METAL FILM .25W 5%	15	R3,13,23,33,43,53,63,73,81,82,98	92
			R1Ø2,1Ø4,1Ø7,115	92
RMF255-8K2	RESISTOR METAL FILM .25W 5%	8	R7,17,27,37,47,56,67,77	92
RMF255-1ØK	RESISTOR METAL FILM .25W 5%	9	R5,15,25,35,45,55,65,75,11Ø	92
RMF255-15K	RESISTOR METAL FILM .25W 5%	8	R8,18,28,38,48,58,68,78	92
RMF255-22K	RESISTOR METAL FILM .25W 5%	12	R1,11,21,31,41,51,61,71,95,96,	92
			R1Ø9,111	92
RMF255-27K	RESISTOR METAL FILM .25W 5%	8	R2,12,22,32,42,52,62,72	92
RMF255-47K	RESISTOR METAL FILM .25W 5%	1	R1Ø1	92
RMF255-22ØK	RESISTOR METAL FILM .25W 5%	1	R1Ø3	92
RMF255-27ØK	RESISTOR METAL FILM .25W 5%	1	R99	92
RMF255-33ØK	RESISTOR METAL FILM .25W 5%	1	R1Ø6	92
RMF252-75R	RESISTOR METAL FILM .25W 2%	2	R86,87	92
63P1Ø2	RESISTOR VARIABLE 1K	1	RV9	69
63P5Ø2	RESISTOR VARIABLE 5K	1	RV1Ø	69
63P1Ø3	RESISTOR VARIABLE 1ØK	9	RRV1-8	69
1N914	DIODE	3	D1-3	81
1N4ØØ2	DIODE	12	D4-15	81
CC4P7	CAPACITOR CERAMIC 4.7pF	1	C25	43

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Replacement Parts List **VA-141A 8 X 1 VIDEO SWITCHER 801101 ISSUE**

Part No.	Description.	Qty	Cct Ref.	Sup
CC100P	CAPACITOR CERAMIC 100pF	1	C45	43
CC330P	CAPACITOR CERAMIC 330pF	1	C43	43
CC1M	CAPACITOR CERAMIC 1uF	8	C11-18	43
CC10N	CAPACITOR CERAMIC 10nF	4	C34,40,41,44	43
CC0M1	CAPACITOR CERAMIC 0.1uF	13	C28,31-33,35-37,39,42,46-49	43
TAS	CAPACITOR TANTALUM 10uF/20V	6	C19-24	67
RB100/25	CAPACITOR ELECTRO 100uF/25V	11	C1-10,29	81
RT2200/25	CAPACITOR ELECTRO 2200uF/25V	3	C27,30,38	81
808-006	CAPACITOR VARIABLE 2-20pF	1	C26	43
2N2905A	TRANSISTOR	2	Q27,28	81
2N3866	TRANSISTOR	1	Q29	81
2N3904	TRANSISTOR	13	Q1,4,7,10,13,16,19,22,25,26,30,	81
			33,34	81
2N4121	TRANSISTOR	8	Q2,5,8,11,14,17,20,23	81
2N4959	TRANSISTOR	8	Q3,6,9,12,15,18,21,24	81
BC557	TRANSISTOR	2	Q31,32	81
7805	IC REGULATOR 5V	1	U10	97
7812	IC REGULATOR 12V	2	U8,9	97
4312-020-3442	FERRITE BEAD	1	L1	81
NE555	TIMER	2	U1,2	63
7400N	QUAD 2 I/P NAND GATE	1	U3	97
7445N	1 OF 10 DECODER DRIVER	2	U6,7	97
7475N	4-BIT LATCH	1	U5	97
74148N	8 I/P PRIORITY ENCODER	1	U4	97
W3116T	IC SOCKET 16 PIN	4	U4-7	99
9050-09-01	STANDOFF TO-18	30		43
9050-08-01	STANDOFF TO-5	2		43
2270 R	HEAT SINK TO-5	2		1
6073THM	HEAT SINK TO-220	3		81

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Replacement Parts List **VA-141A 8 X 1 VIDEO SWITCHER 8Ø11Ø1 ISSUE**

Part No.	Description.	Qty	Cct Ref.	Sup
PL158/15VA	TRANSFORMER	1	T1	39
72Ø1/P3	SWITCH	1	SW1	29
SL77	NEON LAMP	1	LP1	2Ø
FH332	FUSE HOLDER	1	F1	2Ø
2ØX5 1A	FUSE 2Øx5mm 1A	1	F1	43
H2Ø97	CORD GRIP GROMMET	1		96
UG1Ø94/U	CONNECTOR BNC BLKHD (BN12/5)	18		61
516-Ø2Ø-5ØØ-1Ø2	2Ø PIN CONNECTOR	1		99
POWER CORD	POWER CORD 7.5A	1		1
PC8Ø11Ø1	PCB VA-141A	1		68
8Ø159Ø	SWITCH SUB-ASSEMBLY	1		1
8Ø1327	CHASSIS 1.75" (BLACK OR NATURAL)	1		1
8Ø1329	BASE PLATE	1		26
8Ø133Ø	FRONT PANEL	1		1
8Ø1336	REAR PANEL	1		1

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Replacement Parts List **AA-179 8x1 SWITCH PANEL 801590 ISSUE 1**

Part No.	Description.	Qty	Cct Ref.	Sup
RMF255-1K	RESISTOR METAL FILM .25W 5%	8	R1-8	92
6432-0011	SWITCH PCB MTG C/W RED LED	8	LP1-8	49
237-000-141	INSERT WHITE	8		49
PC801832	PCB VA-179	1		68

I.R.T. ELECTRONICS PTY.LTD.

Replacement Parts List H-V SPLIT SUB-BOARD FOR VA-141 802000

Part No.	Description.	Qty	Cct Ref.	Sup
RMF255-4K7	RESISTOR METAL FILM .25W 5%	4	R 2,7,10,11	92
RMF255-10K	RESISTOR METAL FILM .25W 5%	3	R1,3,5	92
RMF255-15K	RESISTOR METAL FILM .25W 5%	1	R8	92
RMF255-22K	RESISTOR METAL FILM .25W 5%	1	R4	92
RMF255-27K	RESISTOR METAL FILM .25W 5%	1	R9	92
RMF255-68K	RESISTOR METAL FILM .25W 5%	1	R6	92
63P103	RESISTOR VARIABLE 10K	2	RV1,2	69
CC1N	CAPACITOR CERAMIC 1000pF	3	C4-6	43
CC2N2	CAPACITOR CERAMIC 2200pF	1	C3	43
CC0M1	CAPACITOR CERAMIC 0.1mF	4	C1,2,7,8	43
2N3904	TRANSISTOR	2	Q1,2	81
9050-09-01	TRANSISTOR STANDOFF TO-18	2		43
4000	IC DUAL 3-I/P NOR GATE INVERT	1	U6	97
4011	IC QUAD 2-I/P NAND GATE	1	U5	97
4023	IC TRIPLE 3-I/P NAND GATE	1	U4	97
4040	IC 12-BIT BINARY COUNTER	1	U3	97
4538	IC DUAL PRECIS MONO MULTIV	2	U1,2	97
W3114T	IC SOCKET 14 PINS	3		99
W3116T	IC SOCKET 16 PINS	3		99
7101 MDAB	PUSHBUTTON LEVER SPDT	2	SW1,2	29
PC802018	PCB H/V SPLIT VA-141 25646	1		68
E802017	ESCUTCHEON H/V SPLIT	1		62