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IRT 1 RU
10 x 1 Video & Audio Switchers
Types VA-400, VA-410, AA-293, AA-294

& Control Panels
VA-291A & VA-292

Designed and manufactured in Australia

IRT 1 RU
10 x 1 Video & Audio Switchers
Types VA-400, VA-410, AA-293, AA-294

& Control Panels
VA-291A & VA-292

Instruction Book

Table of Contents

This instruction book applies to units later than S/N 9500000.

General Description

The IRT 1 RU family of switchers are designed to cover a wide variety of requirements in broadcast switching including source selection and in line monitoring.
Due to the use of high impedance looping inputs, several switchers may be connected to the same sources to provide miniature routing systems.
The standard control system employed uses a BCD coding protocol to minimise the number of wires required in control cables and at the same time allow the use of more than one control panel.
The switchers are based on a common 10 x1 switch matrix. This matrix is controlled by the BCD control system and switchers may be supplied with integral front panel controls or for use with remote control panels. Audio and video switchers may be linked under common control for use in multilevel situations such as audio follow video. As a special case the control system may also be configured for audio breakaway operation.

The switchers in the family comprise:

VA-400	10 x 1 video switcher with local control pushbuttons.
VA-410	10 x 1 video switcher for remote operation.
AA-293	10 x 1 stereo audio switcher with local control pushbuttons.
AA-294	10 x 1 stereo or 20 x 1 mono audio switcher for remote control.
VA-291A	10 x 1 remote control pushbutton panel.
VA-292	20 x 1 remote control pushbutton panel.

VA-400 & VA-410:

The VA-400 and VA-410 are ten input video switchers intended for program and monitoring switching in television broadcasting and production studios.

The VA-400 and VA-410 differ only in that the VA-400 comes complete with integral front panel mounted control switches for local control of the switching and that the VA-410 is intended for remote control operation by means of a VA-291 control panel.

The VA-400/410 consist of 10 high input impedance buffer amplifiers which incorporate two switching elements for decreased crosstalk from the input to the common switch bus when an input is not selected. Video switched to the common bus is amplified by the output amplifier which sources two 75 Ohm output circuits. The switch control circuit encodes the momentary control switch action to 4 bit BCD data which is latched and decoded on the main circuit board of the switcher to control the switching of the input crosspoints. The switching action is timed to occur in the vertical interval of the video signal present at the output of the switcher by locking the data latch enable pulse to a vertical rate pulse derived from that video signal.

The switch control panel can be mounted on the front panel of the video switcher as is the case in the VA-400 or in a separate panel and housing as a VA-291A control panel to remotely control a VA-410 switcher. The switch control panel outputting BCD data and incorporating tally indication, requires only 7 wires to complete the control circuit to the video switcher. Circuit provision is made on the control panel and video switcher to link two switchers together to form a 20 x 1 switcher.

The control circuit is accessible on the rear of the VA-400/410 video switcher to slave the control circuit of AA-289A or AA-294 audio switchers for audio follow video switching of the accompanying audio signals.

The VA-400/410 is housed in an IRT one rack unit (44 mm) high 19" rack mounting chassis with video and control connections to the rear of the unit.

AA-293 & AA-294:

The AA-293 10 x 1 stereo audio switcher is a self contained, mains powered unit designed to occupy one unit of rack mounting space. It has the capability to switch any one of its ten stereo balanced inputs to its stereo balanced output. The output has two isolated feeds. Selection of the required input is made either by pressing one of the 10 indicating pushbuttons on its front panel or via a "D" type connector mounted on the rear panel, using a 4 bit code.

The AA-294 10 x 1 stereo audio switcher is identical to the AA-293 except for the omission of the 10 indicating pushbuttons on its front panel. Its primary application is as an "audio follow video switcher" slaved to a VA-400 10 x 1 video switcher.

Both the AA-293 and AA-294 switchers can be remotely controlled by using a VA-291A or CPS-1050 10 x 1 remote control panels. In the case of the AA-294 this arrangement will provide both remote and local control.

Additionally two switchers may be linked to provide 20 x 1 operation either using the local switches of each AA-293 or the VA-292 or CPS-1052 20 x 1 remote control panels.

The input circuits of this series of switcher are designed to bridge across a balanced 600 Ohm circuit. The output circuit will drive two 600 Ohm balanced circuits, from a low impedance (44 Ohm) source to a maximum level of +24 dBm.

The switchers are housed in an IRT one rack unit (44 mm high) 483 mm (19 inch) rack mounting metal chassis. The input and output circuit connections are by means of plug in terminals to sockets mounted on the edge of the printed circuit boards, accessible from the rear panel of the unit.

Control/tally connections to the switch data buss are made to a parallel pair of 25 pin "D" connectors mounted on the rear panel.
An internal 240 Vac powered regulated power supply provides the operating voltages for the switcher circuitry.

VA-291A:

The VA-291A control panel is a 10 x 1 switch panel with its own encoder and tally circuitry. The VA-291A is used to remotely control the switching action of IRT VA-400, 410 video switchers or AA-289, 290, 293, 294, 295, 296 audio switchers. The data output from the VA-291A is a latched 4 bit BCD [TTL level] signal which is used by the video or audio switcher to switch the selected input. By using active circuitry on the VA-291A the number of wires to the video or audio switcher is reduced from 22 to 10.

Circuitry is included on the VA-291A to deselect a companion control panel when two panels are wired for parallel operation or are used to implement a 19 or 20 x 1 switcher control system.

Power to operate the circuitry of the VA-291A comes from the video or audio switcher, which ensures that if the remote control panel is detached from the switcher operation ceases.

VA-292:

The VA-292 Control Panel is a 20 x 1 Switch Panel with its own encoder and tally circuitry. The VA-292 is used to remotely control the switching action of IRT VA-400, 410 video switchers or AA-289, 290, 293, 294, 295, 296 audio switchers. The data output from the VA-292 is latched 4 bit BCD [TTL level] signals which are used by the video and or audio switchers to switch the selected input. By using active circuitry on the VA-292 the number of wires to the video or audio switchers is reduced from 44 to 15.

Two modes of operation are provided, 20 x 1 control or 10 x 1 control with secondary breakaway facility. Selection of the operating mode is by 6 link positions on the circuit board, these can be moved from a 10 x 1 to a 20 x 1 position for each link.

Circuitry is included on the VA-292 to deselect a companion control panel when two panels are wired for parallel operation.
Power to operate the circuitry of the VA-292 comes from one of the video or audio switchers, which ensures that if the remote control panel is detached from the switcher operation ceases.

NOTE: As described above internal links are used to select the mode of operation, 20 x 1 or 10 x 1 with secondary breakaway.

Standard features:

- Vertical interval video switching.
- Balanced audio switching.
- High impedance looping inputs
- 2 outputs.
- May be linked for 20 x 1 operation.
- Wire per crosspoint and RS232 control options.

Equipment provided:

Local control versions: Switcher and power lead only.

Remote control versions: Switcher, power lead and matching remote control connectors.

Accessories available:-

803017	RS232 serial control sub-board for interfacing to computerised control systems.
803089	External BCD Tally Decoder provides 10 individual tally outputs. Inline conversion unit plugs into second control socket.
803181	Control panel memory sub-board provides battery backup of selected path during power failure for automatic restoration of path on return of power.

Instruction Book.

Technical Specifications

VA-400 & VA-410:

Video input characteristics:

Input Signal Level	1 Vp-p
Input Impedance	Bridging 75 Ohms, Loop through
Return loss	>46 dB to 4.3 MHz
Number of Inputs	10
Input Connectors	BNC.

Transfer Characteristics:

Overall Gain	Unity
Frequency Response	± 0.1 dB to 10 MHz (0.5V p-p Sweep Signal)
Differential Gain	<0.2% (10-90% APL) at 4.43 MHz
Differential Phase	<0.2 degrees (10-90% APL) at 4.43 MHz
Crosstalk	<65 dB to 4.43 MHz

Video output characteristics:

Output signal level	1 Vp-p
Number of outputs	2
Output impedance	75 Ohms
Isolation	>36 dB to 4.3 MHz
Noise at the outputs	70 dB below 1V p-p
Output connectors	BNC.

Control:

Switching time	During the vertical interval. Timing is derived from the output video
Switch control tally	4 Bit BCD data TTL level
Control/tally connectors	25 pin D Sub-miniature

Power requirements	240 Vac ±10% 6 VA

AA-293 & AA-294:

Inputs		Ten left and right balanced circuits bridging (20 K Ohms) input impedance
Outputs		Two balanced circuit (44 Ohms) low impedance drive per channel
Gain		Unity (Adjustable by internal pre-set control to ±3 dB)
Maximum signal level		+24 dBm
Frequency response		± 0.2 dB in the range 20 Hz to 20 KHz. (Referenced to 1 KHz)
Harmonic distortion		< 0.01% in the range 20 Hz to 20 KHz at an audio level of +16 dBm.
Noise at the output (With input terminated by 600 Ohms)		< -100 dB below an output level of +20 dBm. (Bandwidth 20 Hz to 20 KHz)
Crosstalk between inputs		< -85 dB at 20 KHz. (Input of measured channel terminated)
Stereo separation between channels:		< -90 dB at 20 KHz. (Input of measured channel terminated)
Control:	AA-293	Front panel mounted momentary contact push-buttons with LED tally indication.
	AA-294	4 bit TTL level signal compatible with IRT VA-400 video switcher tally output circuit and IRT VA-291A remote control panel
Power requirements:		240 Vac 50 Hz 10 VA

VA-291A:

Input Control	10 momentary contact pushbuttons with white inserts for switch identification
Tally indication	LED's in the switches
Output	4 bit BCD [TTL level] active high
Power requirements	+9 to 15 Volts at 25 mA

VA-292:

Input Control	20 Momentary contact pushbuttons with white inserts for switch identification.
Tally Indication	LED's in the switches
Output	Two 4 bit BCD [TTL level] active high
Power Requirements	+9 to 15 Volts at 25 mA

Other - all units:

Temperature range		0 - 50° C ambient
Mechanical		1 RU chassis suitable for mounting in standard 19" equipment racks.
Finish:	Front panel	Grey enamel, silk screened black lettering & red IRT logo
	Rear panel	Silk screened chassis with input, output & control connectors.
Dimensions	All switchers:	44 mm x 480 mm x 230 mm
	Control panels VA-291A & VA-292:	44 mm x 480 mm x 130 mm

Technical Description

VA-400 & VA-410:

Video input and crosspoint.

The input circuitry consists of ten identical input amplifier and crosspoint circuits all connecting to a common signal bus. The video input is AC coupled to Q1 and Q2 a complementary pair of emitter followers and then switched onto the common bus by Q3.
The video is switched through the input amplifier and crosspoint circuit when the control signal at base network of Q3 and diode D2 is zero, this forward biases transistors Q1 and Q3 allowing the signal to pass through onto the common switch bus.
The switch control line is grounded by the conduction of an open collector transistor in decoder IC U3, which will ground the appropriate control line as determined by the data latched in U2. The control lines not selected will rise in voltage to +9.5 Volts due to the resistor network in the base circuit of Q3 and the diode network to Q1 emitter resulting in Q1 and Q3 base-emitter junctions being reverse biased.
The double action of inhibiting the signal from passing through Q1 and isolating Q3 from the common bus ensures low crosstalk from the unused inputs to the common signal bus.

Output amplifier.

The video output amplifier consists of a differential input amplifier Q4 and Q5 followed by a voltage amplifier Q6 with a collector load consisting of the base bias network D1, D2 and R17 of Q7, Q8 and resistor R18. Q7 and Q8 a complementary common emitter pair provides the current gain required for low output impedance.
The loop gain of the amplifier is set by feedback from the output via R15 and R16 to the base of Q4, the inverting input of the gain block. Frequency response is adjusted by capacitors C15 and C16 in the feedback path.
Adjustment of the DC voltage at the output of the amplifier is achieved by changing the balance of the emitter currents of the input differential transistor pair using RV 2. RV 1 which forms part of a voltage divider at the input of the amplifier is used to set the overall gain of the video switcher to unity.
The output impedance of the amplifier is set at 75 Ohms by resistors R21 and R22 in the output signal path.

Due to small variations in the characteristics of the transistors used in the input amplifiers there will be small DC voltage variations on the signal from each input, in practice these variations will be less than 100 mV and RV 2 in the output amplifier is adjusted so that these variations will average out about zero Volts on the output of the amplifier. This is done by switching from input 1 to 10 in sequence with NO SIGNAL present at the inputs and observing the output DC voltage on an oscilloscope, VR 2 is then adjusted so that the variation observed averages about ZERO volts. A range not greater than ± 50 mV from zero Volts is achieved.

Control Circuit.

The control circuit consists of data latch U2 which stores the data from the switch control panel with a latch pulse timed to the vertical interval of the video present on the output of the switcher, and decoder U3 which decodes the data at the output of U2 to ground the control line of the selected input crosspoint amplifier.

Latch U2 is a CMOS 4 bit latch which latches data present at the data inputs on the trailing edge of the latch pulse applied to the clock input, protection resistors are wired in series with the data input line. Decoder U3 is a TTL 1 of 10 decoder with open collector transistor outputs, the selected output saturating to ground the control line of the appropriate input crosspoint amplifier.
The latch switch pulse is generated by locking an astable oscillator circuit to vertical rate then delaying the edge of the oscillator output signal, to trigger a mono-stable to generate a latch pulse timed to fall approximately 10 lines into the field period of the video signal.

An emitter follower stage Q9 with a tuned circuit L1, C18 in its emitter circuit to reduce colour subcarrier amplitude and high frequency response of the signal and so improve the noise immunity of the sync separator, buffers the signal from the switcher output amplifier. Q10 the sync separator, saturates when the negative-going sync tips draw base current, producing 12v p-p of sync signal at the collector.
The mixed sync is integrated by network R27, C20 and R28, C21 this signal decreasing the base current of Q11 to produce a vertical rate signal at Q11 output. The vertical rate signal at the collector of Q11 is used to synchronise astable oscillator U1/3.

U1 is a quad CMOS 2-input NAND Schmitt Trigger IC, one section is used as an astable by feedback from the output to the input, the free-running frequency being less than 50 Hz. The vertical rate signal from Q11 resets the oscillator and so locks its operation to vertical rate.
The edge of the oscillator output signal coincident with the vertical block is used to trigger a delay circuit consisting of another section of U1, this delays the edge of the astable by 600 μs as set by RV 3. The delayed signal is then used to trigger another section of U1 via a differentiator network C24, R32 to produce the latch trigger pulse for U2. Resistors R34, R35 attenuate the latch trigger pulse to interface the 12 Volt logic with the 5 Volt logic levels of the latch and decoder circuits.

Note that if no signal is present at the switcher output to synchronise the astable oscillator, latch pulses will still be generated to allow the switcher to operate, these will occur at the free-running frequency of the astable oscillator.

Switch Control Panel.

Note: Only the VA-400 switcher uses an internal switch control panel the VA-410 switcher is remotely controlled by a separate VA-291A remote control panel.

The VA-291A circuitry consists of ten pushbutton switches with integral tally LED's connected to a ten input priority encoder, the data from the encoder is stored in a 4 bit latch. This data is sent to the video or audio switcher input selection circuit via a buffer IC to control the input selection and is decoded on the switch panel to light a TALLY led on the pushbutton of the selected input.

The Version 2 VA-291A consists of two printed circuit boards one for the switches and the tally decoder IC and the other for the encoder, latch and data buffer circuits.
The second board plugs onto the first which has reduced the overall length of the switch panel printed circuit board to 230 mm. U2 and U3 form a ten input priority encoder circuit with 4 bit BCD data and strobe outputs which are used to latch the data in latch U4.
At the same time the strobe signal sets a RS flip-flop circuit U6/1 and U6/2 which is connected to the enable inputs of a 4 bit data buffer U5. The data buffer U5 is connected to the data output lines from the VA-291A to provide the control signal for a IRT Video or Audio switcher.

Parallel operation of two VA-291A control panels is provided for by using the strobe signal from each panel to deselect the other panel. The RS flip-flop circuit U6/1 and U6/2 is reset using an external unlatch signal derived from the strobe out of the other VA-291A control panel.
With link 2 in the PAR. position when a unlatch signal resets the RS flip-flop, the output lines of the buffer IC U5 go TRI-STATE which allows the data from the enabled control panel to control the video or audio switcher whilst at the same time the tally circuits on both control panels indicating the input selected.

The power to operate the switch panel comes from the video switcher main circuits by utilising the +12 Volt supply line and regulating this voltage down to +5 Volts on the switch panel using U7 a 78L05 100 mA three terminal regulator IC.

Power Supplies.

Operating voltages for the VA-400/410 switchers are generated in a 240 Volt AC powered supply circuit, which generates ± 12 Volts and +5 Volts by using three terminal fixed regulator IC's to set the unregulated voltages from bridge rectifiers D5 to D12.

On the rear panel of the VA-400 a switch to disable the local control panel can be wired across LINK 1 of the VA-291A board.

AA-293 & AA-294:

Main construction of the AA-293 & AA-294 is on two printed circuit boards.

Board 1 provides one audio channel and supporting logic and power supply. (Dwg 803350)
Board 2 is mounted on top of the 803350 assembly and provides the second audio channel and supporting logic. Its circuit is shown in Dwg 803341.

Board 2 is almost identical to Board 1 .
The differences are -

- Board 2 gets its regulated ±12 Vdc from Board 1.
- The 'E' input to Board 2 U17 is fed from the 'E' output of U17 Board 1.
- On Board 1 points X and Y are the output of the switching chips, but on Board 2 X and Y are the input to the over-ranged inputs of its switching chips. This facilitates an optional 20 x 1 operation mode.

Chassis wiring for the AA-294 is shown on Dwg 803436 and for the AA-293 on Dwg 803435.

Units fitted with power transformer part No 177-953 can be rewired to operate on 110V AC.

Board 1.: (Refer to drawing 803350.)

The drawing shows 10 identical input buffer amplifiers each using one NE5532 op amp. The selection of the active input is done in one of three dual 4 input multiplexer IC's type 4052.
U11 is a balance to unbalance converter. The common mode rejection capability of this converter can be optimised by adjustment of RV 2.
RV 1 is a pre-set gain control and is normally adjusted for unity voltage gain through the switcher.
U12 and U13 make up two balanced output drive amplifiers.

The power supply has a bridge rectifier (D1-4) and two 3 terminal regulators providing regulated + and - 12v supply lines. IC's U14,15,16 require + and - 5v supplies which are provided by U18 and 19. U17 also uses the +5v supply.

U17 is a programmable GAL which decodes the latched 4 bit selection data (from the rear D connector, and/or in the case of the AA-293, from the front panel switch logic). The form of this logic is a) a 2 bit code for selection of one of four chip inputs and b) the chip select lines to select the active chip.
Any code greater than 10 (hex A) selects an unused input on U16.

To facilitate future developments U17 can utilise an input from PL 6 pin 11 as the MSB of a five bit code for 20 x 1 selection. For this to function correctly LK 1 should be installed. (For normal operation it must not be installed.) While LK 1 is installed output 'E' of U17, used by the upper board of stereo switchers, will be the inverse of PL 6 pin 11.

The control circuit of the AA-293 is shown on Dwg 802730.
It consists of an active switch panel with ten push-buttons which is mounted on the front panel of the switcher, and logic circuits to encode the switch selection into a 4 bit format.
On the switch panel U1 and part of U2 are wired as a 10 input priority encoder circuit with the data bits A, B, C and D appearing at U2/3 U1/7 U1/6 and U2/4 respectively.
The data on these four lines is then applied to the data latch U4 via the OR gates of U3.
Actuation of any one of the input switches produces a key STROBE signal at U2/11 which is then applied to the enable input of the LATCH U4 via one part of U2.
RC networks consisting of 22 KΩ resistors and 1 nF capacitors on the data input circuits of U4 hold the data there for a short time after the strobe pulse enables the latch to ensure that the correct data is latched.
The data thus stored in U4 is wired to the main board to actuate the required audio cross-point and is also decoded by U5 to light a tally LED mounted in the switch as a visual indication of the selected input.

Power to operate the switch control panel is derived from the +12 Vdc supply line of the main board and regulated to +5 Vdc by U5.

VA-291A:

The VA-291A circuitry consists of ten pushbutton switches with integral tally LED's connected to a ten input priority encoder, the data from the encoder is stored in a 4 bit latch. This data is sent to the video or audio switcher input selection circuit via a buffer IC to control the input selection and is decoded on the switch panel to light a TALLY led on the pushbutton of the selected input.

The Version 2 VA-291A consists of two printed circuit boards one for the switches and the tally decoder IC and the other for the encoder, latch and data buffer circuits. The second board plugs onto the first which has reduced the overall length of the switch panel printed circuit board to 230 mm. U2 and U3 form a ten input priority encoder circuit with 4 bit BCD data and strobe outputs which are used to latch the data in latch U4. At the same time the strobe signal sets a RS flip-flop circuit U6/1 and U6/2 which is connected to the enable inputs of a 4 bit data buffer U5. The data buffer U5 is connected to the data output lines from the VA-291A to provide the control signal for a IRT Video or Audio switcher.

Parallel operation of two VA-291A control panels is provided for by using the strobe signal from each panel to deselect the other panel. The RS flip-flop circuit U6/1 and U6/2 is reset using an external unlatch signal derived from the strobe out of the other VA-291A control panel. With link 2 in the PAR. position when a unlatch signal resets the RS flip-flop, the output lines of the buffer IC U5 go TRI-STATE which allows the data from the enabled control panel to control the video or audio switcher whilst at the same time the tally circuits on both control panels indicating the input selected.

A composite 20 x 1 control panel can be made from two VA-291A panels by using each panel to control a 10 x 1 switcher and using the strobe from each panel to deselect the other panel. In this mode of operation link 2 is set in the 19/20 x 1 position and links 3 to 6 are connected to +V. When one VA-291A panel is operated the other panel is deselected by resetting the RS flip-flop and its data output is now the data set by links 3 to 6. With these set to +V the decoders in the switcher control circuit and the panel tally circuit will overange and no input will be selected in that switcher. In this way with two video or audio switchers connected together on their common switch bus only the signal from the selected input is present on the output signal circuit.

A composite 19x1 control panel can be made from two VA-291A panels by using each panel to control a 10 x 1 switcher and again using the strobe from each panel to deselect the other panel. In this mode the **FIRST** panel for inputs 1 to 10 is set with link 2 in the 19/20 x 1 position and links 3 to 6 connected to +V. The **SECOND** panel for inputs 11 to 19 is set with link 2 in the 19/20 x 1 position and Link 3 to +V, link 4 to gnd. link 5 to gnd. and link 6 to +V. Selection of a input on the first panel will cause the second panel to select input 10, and selection of a input on the second panel will cause the first panel to be deselected with no tally indication showing. In this way with the signal output of the first video or audio switcher connected to signal input 10 of the second switcher a 19x1 switcher is implemented, with the second video or audio switcher sourcing the signal output of the composite switcher.

Power to operate the VA-291A switch control panel is derived from the positive supply line of the video or audio switcher and regulated to +5 V by U7.

VA-292:

The VA-292 circuitry consists of twenty pushbutton switches with integral tally LED’s connected to two ten input priority encoder circuits, the data from the encoders is stored in 4 bit latches. This data is sent to the video or audio switcher input selection circuits via buffer IC's to control the input selection and is decoded to light a TALLY LED on the pushbutton of the selected input.

The VA-292 consists of two printed circuit boards one for the switches, and the other for the encoder, latch, data buffer and tally circuits. The second board plugs onto the first to make a compact assembly. U1 and U2 form a ten input priority encoder circuit with 4 bit BCD data and strobe outputs which are used to latch the data in latch U3. At the same time the strobe signal sets RS flip-flop circuit U5/1 and U5/2 which is connected to the enable inputs of a 4 bit data buffer/switch circuit U4. The data buffer/switch U4 is connected to the data output lines from the VA-292 to provide the control signal for first ten inputs of a switcher.

U7 and U8 form another ten input priority encoder circuit with 4 bit BCD data and strobe outputs which are used to latch the data in latch U9. At the same time the strobe signal sets RS flip-flop circuit U11/1 and U11/2 which is connected to the enable inputs of a 4 bit data buffer/switch circuit U10. The data buffer/switch U10 is connected to the data output lines from the VA-292 to provide the control signal for second ten inputs of a switcher.

20 x 1 OPERATION: With links 2 to 7 in the 20 x 1 position the 10 input encoder control circuits' flip-flops are reset by the strobe signal from the other 10 input bank. This switches the data output buffer/switch IC of the non-selected bank to 1111. All the decoders used to select the inputs in IRT switchers over-range with this signal and no input will be selected.

10 x 1 OPERATION: With links 2 to 7 in the 10 x 1 position a strobe from the first 10 input encoder circuit bank causes the same data to be switched through to U4 and U10. Both output data lines will carry the same data. Activation of a switch in the second 10 input encoder circuit will cause U10 to switch new data to the second set of data lines. In this way the switcher controlled by the second bank breaks away from the selection of the main switcher selected by the first bank. Activation of any input on the main first bank will cause the break away signal to follow the main signal again.

In this way with a IRT video Switcher controlled by the first bank and a IRT audio switcher controlled by the second bank, break away audio operation is achieved with automatic switching back to AFV operation by selecting any input on the first bank.

NOTE: The selection of the break away audio input can be held without change when the video is changed by holding down the selected audio input switch on bank two and then at the same time selection a new video input on bank one, this will momentarily prevent the video selection from changing the audio selection.

Parallel operation of two VA-292 control panels is provided for by using the strobe signal from each panel to deselect the other panel. The RS flip-flop circuit U12/3 and U12/4 is reset using an external unlatch signal derived from the strobe out of the other VA-292 control panel. When a unlatch signal resets the RS flip-flop, the output lines of the buffer IC's U4 and U10 go TRI-STATE which allows the data from the enabled control panel to control the video or audio switchers whilst at the same time the tally circuits on both control panels indicating the input selected.

Power to operate the VA-292 switch control panel is derived from the positive supply line of the video or audio switcher and regulated to +5 V by U14.

Pre-Installation

Operational Safety

WARNING

Operation of electronic equipment involves the use of voltages and currents which may be dangerous to human life. Maintenance 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.

Handling:

This equipment contains static sensitive devices and proper static free handling precautions should be observed if covers are removed for any reason.

Power:

AC mains supply: Ensure that operating voltage of unit and local supply voltage match and that correct rating fuse is installed for local supply.

Earthing:

Particular care should be taken to ensure that the frame is connected to earth for safety reasons.

Signal earth: For safety reasons a connection is made between signal earth and chassis earth. No attempt should be made to break this connection.

Audio:	balanced signal connection with Gnd pin marked on rear assembly.
Video inputs:	differential type not connected directly to signal or chassis earth.
Video outputs:	Internally connected to reference earth.
Control inputs & outputs:	Separate connections are provided for signal and DC power returns. It is important that these should be kept separate for noise immunity.

INTERNAL ADJUSTMENTS

The following adjustable resistors 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 equipment to reach temperature stability.

AA-293 & AA-294:

The master gain of each channel is set for unity during factory alignment and normally will not require adjustment. If the gain needs to be reset this can be done by adjustment of the pre-set potentiometers RV 1 on each switcher channel.

Configuration

VA-400 & VA-410:

Extended Operation.

19 x 1 Video switcher
A composite 19x1 switcher can be made from two video switchers using a VA-291A panel to control each 10 x 1 switcher and using the strobe from each panel to deselect the other panel.
In this mode the **FIRST** panel for inputs 1 to 10 is set with link 2 in the 19/20 x 1 position and links 3 to 6 connected to +V.
The **SECOND** panel for inputs 11 to 19 is set with link 2 in the 19/20 x 1 position and Link 3 to +V, link 4 to gnd. link 5 to gnd. and link 6 to +V.
Selection of a input on the first panel will cause the second panel to select input 10, and selection of a input on the second panel will cause the first panel to be deselected with no tally indication showing.

In this way with the signal output of the first video switcher connected to signal input 10 of the second switcher a 19x1 switcher is implemented, with the second video switcher sourcing the signal from the composite switcher.

20 x 1 Video switcher
A composite 20 x 1 switcher can be made from two switchers using a VA-291A panel to control each 10 x 1 switcher and using the strobe from each panel to deselect the other panel.

In this mode of operation on each control panel link 2 is set in the 19/20 x 1 position and links 3 to 6 are connected to +V. When one VA-291A panel is operated the other panel is deselected by resetting the RS flip-flop and its data output is now the data set by links 3 to 6. With these set to +V the decoders in the switcher control circuit and the panel tally circuit will over-range and no input will be selected in that switcher.

In this way with the two switchers connected together on their common switch bus by rewiring video connector J2 to the switch bus on each switcher only the signal from the selected input is present on the output signal circuit of each switcher.

The video common switch bus of each switcher is connected by means of a small length of coaxial cable to J2 of each switcher.
This is done by removing the connection from J2 to R22 and wiring it instead to R40 located near RV 1 to J2. On the rear panel of each switcher a small length of cable is used to connect the J2 connectors of each switcher together. Video output from the combination switcher being available from the J1 connector of each switcher.

NOTE: 20 x 1 operation and parallel remote control of a VA-400 with VA-291A circuits cannot be done at the same time. This can only be done using VA-292 20 x 1 control panels in the local and remote positions using VA-410 video switchers wired for 20 x 1 operation.

AA-293 & AA-294:

20 x 1 Operation of the AA-294 audio switcher

On a AA-294 the output from the selector chips on Board 1 is fed via terminals X and Y to the over-range inputs of U16 on Board 2, therefor when using a 20 x 1 configuration only use the outputs of Board 2.

The 20 x 1 remote control panel (or the combination of two AA-291 10 x 1 remote control panels in a 20 x 1 mode) use two 4 bit codes for control. Therefore you must rewire the Board 2 control lines as follows -

To separate the control circuit remove the wiring of the control lines A, B, C, D & GND between Board 1 and Board 2.

Wire the control lines (A, B, C, D & GND) from Board 2 to the PCB on the rear panel for the control in/out connectors.

A	to	8
B	to	7
C	to	6
D	to	5
GND	to	4

The AA-294 is now a 20 x 1 one channel switcher with the lower board used for inputs 1 - 10, the control wiring to pins 21 to 18. The upper board being used for inputs 11 - 20, and the control wiring to pins 4 to 8 of the control connectors J1 and J2.
To connect the control circuits of a 20 x 1 audio switcher to a VA-292 remote control panel the following cable is required.

Cable from the control panel J1 to switcher J1.

VA-292	[15 pin 'D' female]		to	AA-295	[25 pin 'D' male]
Pin				Pin	
9	+V IN		to	14	+V OUT
10	GND		to	15	GND
11	GND	I/P's 1-10	to	17	GND
12	'D'	I/P's 1-10	to	18	'D'
13	'C'	I/P's 1-10	to	19	'C'
14	'B'	I/P's 1-10	to	20	'B'
15	'A'	I/P's 1-10	to	21	'A'
1	GND	I/P's 11-20	to	4	GND
5	'D'	I/P's 11-20	to	5	'D'
4	'C'	I/P's 11-20	to	6	'C'
3	'B'	I/P's 11-20	to	7	'B'
2	'A'	I/P's 11-20	to	8	'A'

To connect the control circuits of a 20 x 1 audio switcher to a VA-415 video switcher for audio follow video operation the following cable is required.

Cable from J4 on the VA-415 to J1 on the 20 x 1 switcher.

VA-415	[25 pin 'D' male]		to	AA-294	[25 pin 'D' male]
Pin				Pin	
17	GND	I/P's 1-10	to	17	GND
18	'D'	I/P's 1-10	to	18	'D'
19	'C'	I/P's 1-10	to	19	'C'
20	'B'	I/P's 1-10	to	20	'B'
21	'A'	I/P's 1-10	to	21	'A'
4	GND	I/P's 11-20	to	4	GND
5	'D'	I/P's 11-20	to	5	'D'
6	'C'	I/P's 11-20	to	6	'C'
7	'B'	I/P's 11-20	to	7	'B'
8	'A'	I/P's 11-20	to	8	'A'

Further information on the interconnection of a 20 x 1 audio switcher can be obtained from the AA-295, AA-296 instruction book.

Installation

Installation in rack:

The chassis should be installed in the rack using standard ¼" or 6 mm screws fitted with nylon washers to prevent damage to the front panel.

Connections:

VA-400 & VA-410:

Video input connections are to pairs of BNC connectors wired for bridging across 75 Ohm circuits, if not used to bridge a video circuit the second connector of the pair must be terminated by a 75 Ohm termination.

Video output connections are to BNC connectors J1 and J2.

AA-293 & AA-294:

Signal connections are by means of compression screw terminal strips, which plug into sockets mounted on the rear of the printed circuit board and protruding through the rear panel of the chassis.

The input and output connection sets consist of groups of three terminals vis.

Active +; Active-; Ground.

Input 1 is to the left of the chassis looking at the rear.

For mono operation it is usual to connect the input audio cable to the Left input pins. For stereo connect the Left input cable to the Left input and the Right input audio cable to the Right input.

If input termination is required then termination resistors should be fitted to the input sockets on the rear assembly.

Connect as many outputs as required. Remember for stereo operation to observe the polarity markings on the rear assembly.

Control connections - Switchers:

Control tally connections are made to J1/J2 a pair of 25 pin "D" female sockets on the rear panel.
Note: The 25 pin connectors are wired in parallel to eliminate the need for wiring different cable sets to the same plug if other equipment is connected to the control bus.

Warning:

The 25 pin control connectors include connections which are direction sensitive and require control cables to be wired with certain pins cross connected and others with no connection. See following tables for correct cable wiring for particular combinations.

Under no circumstances should cables be used which connect all 25 pins in a pin to pin arrangement. This will result in improper operation of the switcher and may cause damage to switchers and or control panels.

Control connectors J1/2:

Pin	**Standard wiring**	**10 way** **Wire per crosspoint** **or Joystick operation**	**20 x 1**	**20 way** **Wire per crosspoint**
1		1		1
2		2		2
3		3		3
4		4	Gnd	4
5		5	Bit 'D' I/P's 11-20	5
6		6	Bit 'C' I/P's 11-20	6
7		7	Bit 'B' I/P's 11-20	7
8		8	Bit 'A' I/P's 11-20	8
9		9		9
10		10		10
11		WPX Common Gnd		11
12				12
13				13
14	+12 Vdc to remote panel	+12 Vdc to remote panel	+12 Vdc to remote panel	14
15	Power ground.	Power ground.	Power ground.	15
16				16
17	Signal return.	Signal return.	Signal return.	17
18	Bit D	Bit D	Bit D I/P's 1-10	18
19	Bit C	Bit C	Bit C I/P's 1-10	19
20	Bit B	Bit B	Bit B I/P's 1-10	20
21	Bit A	Bit A	Bit A I/P's 1-10	WPX Common Gnd
23	UL/ST signal return	UL/ST signal return	UL/ST signal return	
24	Strobe out	Strobe out	Strobe out	
25	Unlatch in	Unlatch in	Unlatch in	

Control connections - VA-291A Control panel:

Control output and power input connections are via a 15 pin "D" type connector J1 mounted on the back panel.

Pin	15	Bit	A	BCD Output [5v CMOS logic]
	14	"	B	"
	13	"	C	"
	12	"	D	"
	11	SIGNAL Ground		
	10	POWER Ground		
	9	+ Volts in	"	
	8	UNLATCH IN [5v CMOS logic]		
	7	STROBE OUT	"	
	6	Ground		
	5	Optional WPX		Common
	4	"		SW 4
	3	"		SW 3
	2	"		SW 2
	1	"		SW 1.

Control connections - VA-292 Control panel:

Control output and power input connections are via a 15 pin "D" type connector J1 mounted on the back panel.

NOTE: As described internal links are used to select the mode of operation, 20 x 1 or 10 x 1 with secondary breakaway.

Pin	15	Switch 1 - 10, Bit		A	BCD Output [5v CMOS logic]
	14	"	"	B	"
	13	"	"	C	"
	12	"	"	D	"
	11	SIGNAL Ground			
	10	POWER Ground			
	9	+ Volts in	"		
	8	UNLATCH IN [5v CMOS logic]			
	7	STROBE OUT	"		
	6	Ground			
	5	"	D	"	
	4	"	C	"	
	3	"	B	"	
	2	Bit	A	BCD Output [5v CMOS logic]	
	1	Ground			

Control cable examples:

Connections for two switchers: (Normal married operation.)

To connect the data lines from an audio switcher to a second audio switcher or a controlling video switcher the following cable is required.

25 Pin "D" (male)		to	25 Pin "D" (male)	
	Pin	to	Pin	
"A-D RETURN"	17	to	17	"GND"
"D"	18	to	18	"D"
"C"	19	to	19	"C"
"B"	20	to	20	"B"
"A"	21	to	21	"A"

Connections for 10 x 1 control panel to switcher:

To connect a VA-291A remote control panel to an audio or video switcher the following cable is required.

Audio switcher 25 Pin "D" (male)		to	Remote panel (VA-291A) 15 Pin "D"	(female)
	Pin	to	Pin	
"U/L"	25	to	7	"ST"
"ST"	24	to	8	"U/L"
"UL/ST RETURN"	23	to	6	"UL/ST RETURN"
"A"	21	to	15	"A"
"B"	20	to	14	"B"
"C"	19	to	13	"C"
"D"	18	to	12	"D"
"A-D RETURN"	17	to	11	"A-D RETURN"
"GND"	15	to	10	"GND"
"+V"	14	to	9	"+V"

NOTE: If parallel operation using two control panels is not required the first three connections from 25-23 are not required.

20 x 1 using 2 x VA-291A 10 x 1 control panels:

The connections for wiring two panels together to form a 20 x 1 control panel are via 3 pins of the 15 pin "D" type connector J1.

The connections are:

Pin	8	UNLATCH IN [5v CMOS logic]
"	7	STROBE OUT "
"	6	Ground

Connections for 20 x 1 Video + Audio switcher - remote control:

Ensure links on the VA-292 are in the correct positions for 20 x 1 operation.

Rewire AA-294 to drawing No: 803436 sheet 2.

Rewire VA-410 J2 (video output) to R40 instead of O/P 2 on both VA-410's.

Three cables are required and need to be wired as follows:

Cable A:

25 Pin "D" (Male)		to	25 Pin "D" (Male)	
(Gnd 2)	4	to	4	(Gnd 2)
(D2)	5	to	5	(D2)
(C2)	6	to	6	(C2)
(B2)	7	to	7	(B2)
(A2)	8	to	8	(A2)
(Gnd 1)	17	to	17	(Gnd 1)
(D1)	18	to	18	(D1)
(C1)	19	to	19	(C1)
(B1)	20	to	20	(B1)
(A1)	21	to	21	(A1)

Cable A INV:

25 Pin "D" (Male)		to	25 Pin "D" (Male)	
(Gnd 1)	17	to	4	(Gnd 2)
(D1)	18	to	5	(D2)
(C1)	19	to	6	(C2)
(B1)	20	to	7	(B2)
(A1)	21	to	8	(A2)
(Gnd 2)	4	to	17	(Gnd 1)
(D2)	5	to	18	(D1)
(C2)	6	to	19	(C1)
(B2)	7	to	20	(B1)
(A2)	8	to	21	(A1)

Cable B: Is a 15 pin "D" (Female) to 25 Pin "D" (Male) wired to "Cable 1" in the VA-292 Instruction Book.

The cables should be connected as follows:

Cable B is connected between the VA-292 and AA-294 J1.

Cable A is connected between the AA-294 J2 and the first VA-410 J1.

Cable A INV is connected between the first VA-410 J2 and the second VA-410 J1.

CPS-1052 control panel 20 x 1 operation:
This requires a different program to be present in PLA U 1 of each half of a CPS-1052. This must be specially ordered from IRT and details of connections will be supplied with the replacement PLA chip (CPS1050U).

The following cable is required between PL 6 on each half of the CPS-1052.

Cable A: - CPS-1052 connection for 20 x 1 operation.

½ CPS-1052 (1-10) PL 6			½ CPS-1052 (11-20) PL 6	
"Unlatch out"	5B	to	5A	"Busy In "
"Busy In"	5A	to	5B	"Unlatch Out"

Rewire AA-294 to drawing No: 803436 sheet 2 (20 x 1 mono operation).
Rewire VA-410 J2 (video output) to R40 instead of O/P 2 on both VA-410's (10 x 1 operation with external buss access).

Four more cables are required and need to be wired as follows:

Cable B: - CPS-1052 to VA-410 (I/P 1 to 10 switcher) J 1.

VA-410 1 RU switcher J 1			Remote panel (CPS-1052).
25 Pin "D" (male)		to	10 Pin HE14 (female)
	Pin	to	Pin - PL 5 Buttons 11 - 20.
"A"	21	to	4A "A"
"B"	20	to	3B "B"
"C"	19	to	3A "C"
"D"	18	to	2B "D"
"GND"	15	to	1B "GND"
"+V"	14	to	1A "+V"
			Pin - PL 5 Buttons 1 - 10.
"A"	8	to	4A "A"
"B"	7	to	3B "B"
"C"	6	to	3A "C"
"D"	5	to	2B "D"
"GND"	15	to	1B "GND"
"+V"	14	to	1A "+V"

Cable C VA-410 (I/P 11 to 20 switcher) J 2 to VA-410 (I/P 1 to 10 switcher) J 1.

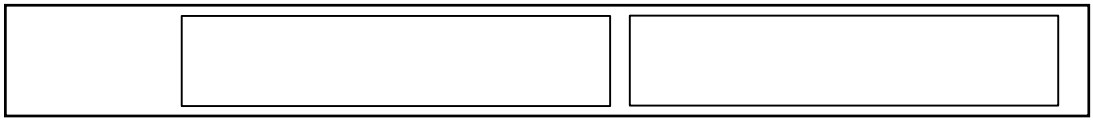
25 Pin "D" (Male)		to	25 Pin "D" (Male)
(Gnd 1)	17	to	4 (Gnd 2)
(D1)	18	to	5 (D2)
(C1)	19	to	6 (C2)
(B1)	20	to	7 (B2)
(A1)	21	to	8 (A2)
(Gnd 2)	4	to	17 (Gnd 1)
(D2)	5	to	18 (D1)
(C2)	6	to	19 (C1)
(B2)	7	to	20 (B1)
(A2)	8	to	21 (A1)

Cable D: VA-410 (I/P 1 to 10 switcher) J 2 to AA-294 (I/P 1 to 20 switcher left channel) J 1.

25 Pin "D" (Male)		to	25 Pin "D" (Male)
(Gnd 2)	4	to	4 (Gnd 2)
(D2)	5	to	5 (D2)
(C2)	6	to	6 (C2)
(B2)	7	to	7 (B2)
(A2)	8	to	8 (A2)
(Gnd 1)	17	to	17 (Gnd 1)
(D1)	18	to	18 (D1)
(C1)	19	to	19 (C1)
(B1)	20	to	20 (B1)
(A1)	21	to	21 (A1)

Cable E: AA-294 (I/P 1 to 20 switcher left channel) J2 to AA-294 (I/P 1 to 20 switcher right channel) J1.

Same as cable D.



Maintenance & Storage

Maintenance:

No regular maintenance is required.

Care however should be taken to ensure that all connectors are kept clean and free from contamination of any kind.

Storage:

If the equipment is not to be used for an extended period it is recommended the whole unit be placed in a sealed plastic bag to prevent dust contamination. In areas of high humidity a suitably sized bag of silica gel should be included to assist deter corrosion.

Warranty & Service

Equipment is covered by a limited warranty period of five years from date of first delivery unless contrary conditions apply under a particular contract of supply.

Equipment warranty is limited to faults attributable to defects in original design or manufacture. Warranty on components shall be extended by IRT only to the extent obtainable from the component supplier.

Equipment return:

Prior to arranging service ensure that the fault is in the unit to be serviced and not in associated equipment. If possible confirm this by substitution.

Before returning equipment contact should be made with IRT or your local agent to determine whether the equipment can be serviced in the field or should be returned for repair.

The equipment should be properly packed for return observing antistatic procedures.

The following information should accompany the unit to be returned:

1. A fault report should be included indicating the nature of the fault
2. The operating conditions under which the fault initially occurred.
3. Any additional information which may be of assistance in fault location and remedy.
4. A contact name and phone and fax numbers.
5. Details of payment method for items not covered by warranty.
6. Full return address.

Please note that all freight charges are the responsibility of the customer.

The equipment should be returned **to the agent who originally supplied the equipment or, where this is not possible**, to IRT direct as follows.

Equipment Service
IRT Electronics Pty Ltd
26 Hotham Parade
ARTARMON
N.S.W. 2064
AUSTRALIA

Phone: 61 2 9439 3744
Fax: 61 2 9439 7439

Drawing Index

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803350		10 x 1 audio switcher Board 1.
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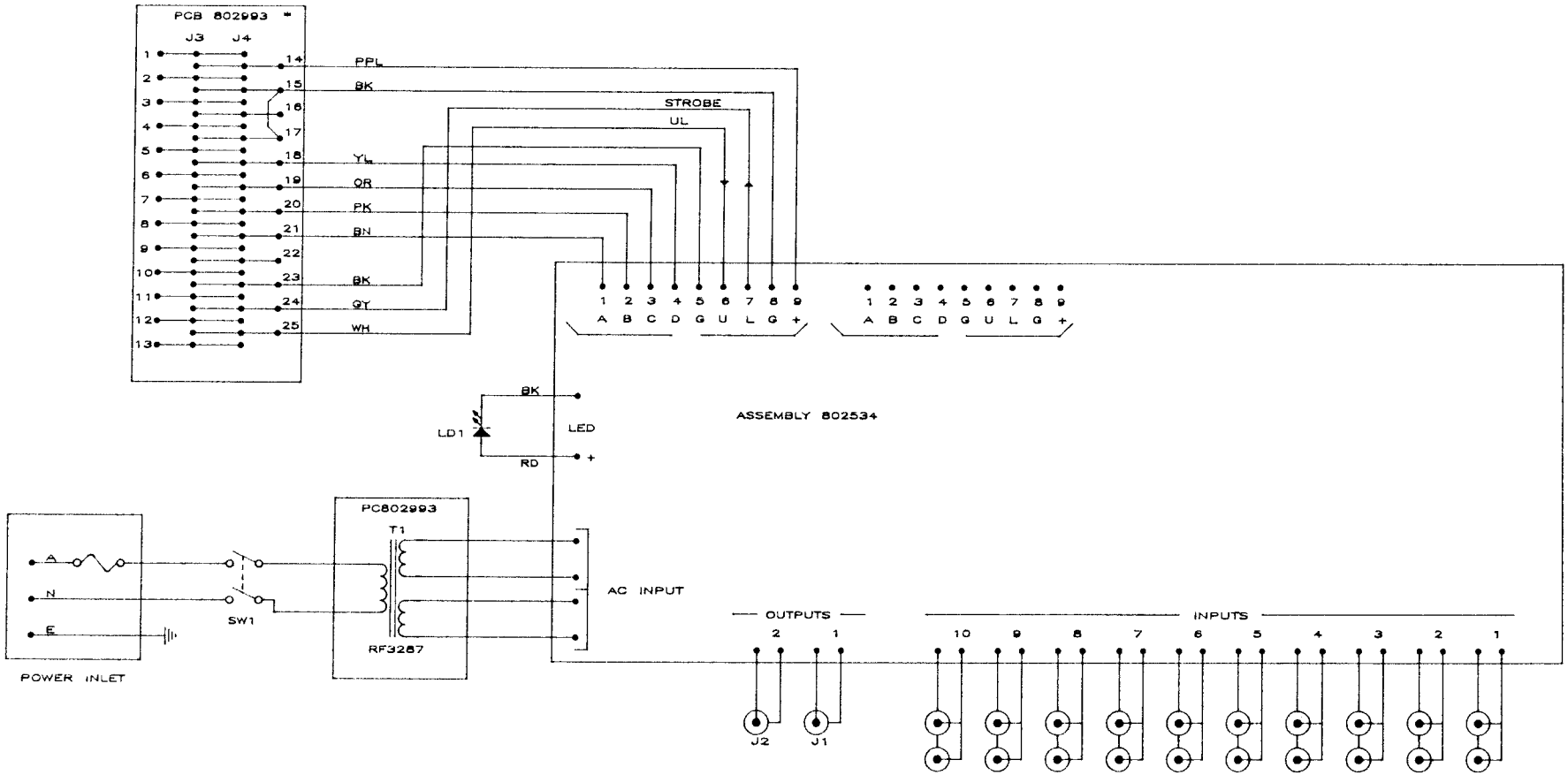
803017		RS232 serial control for VA-400/410.
803089		10 x 1 switcher tally decoder



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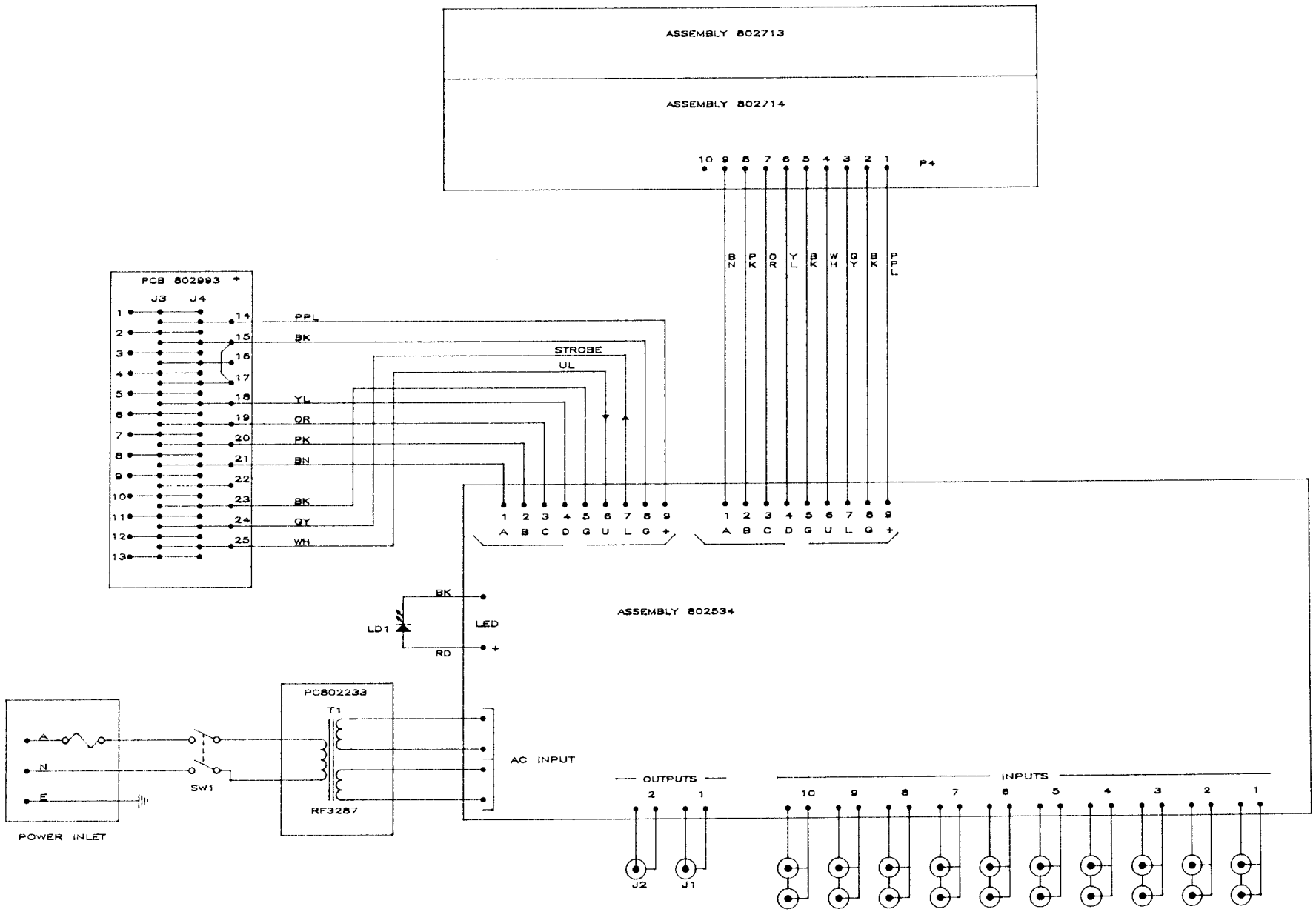

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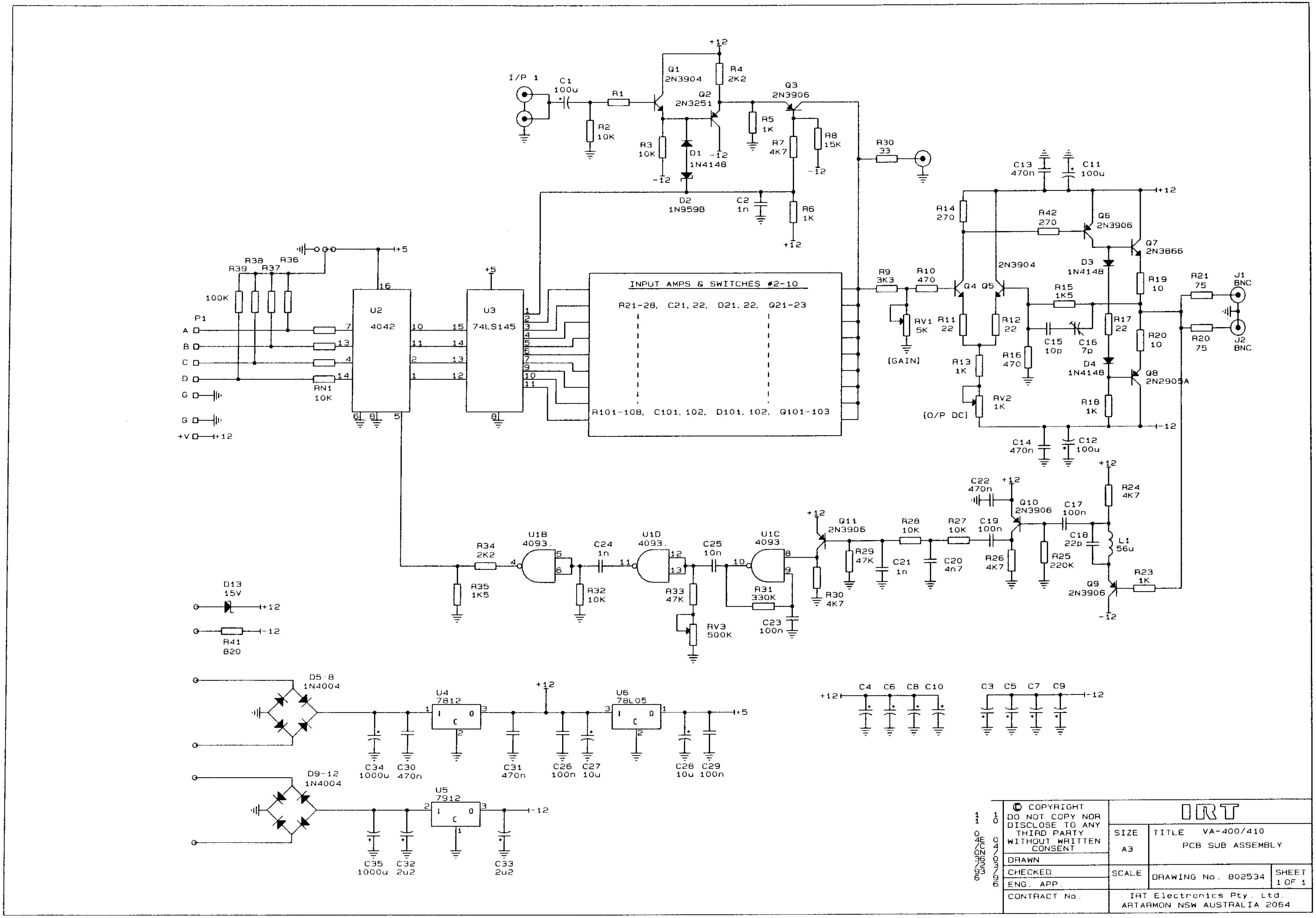

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R101-108, C101, 102, D101, 102, Q101-103
U2 4042
U3 74LS145
U1B 4093
U1D 4093
U1C 4093
U4 7812
U5 7912
U6 78L05
D5-8 1N4004
D9-12 1N4004
D13 15V
R41 820
(GAIN)
(O/P DC)
J1 BNC
J2 BNC
P1
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SIZE A3
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SHEET 1 OF 1
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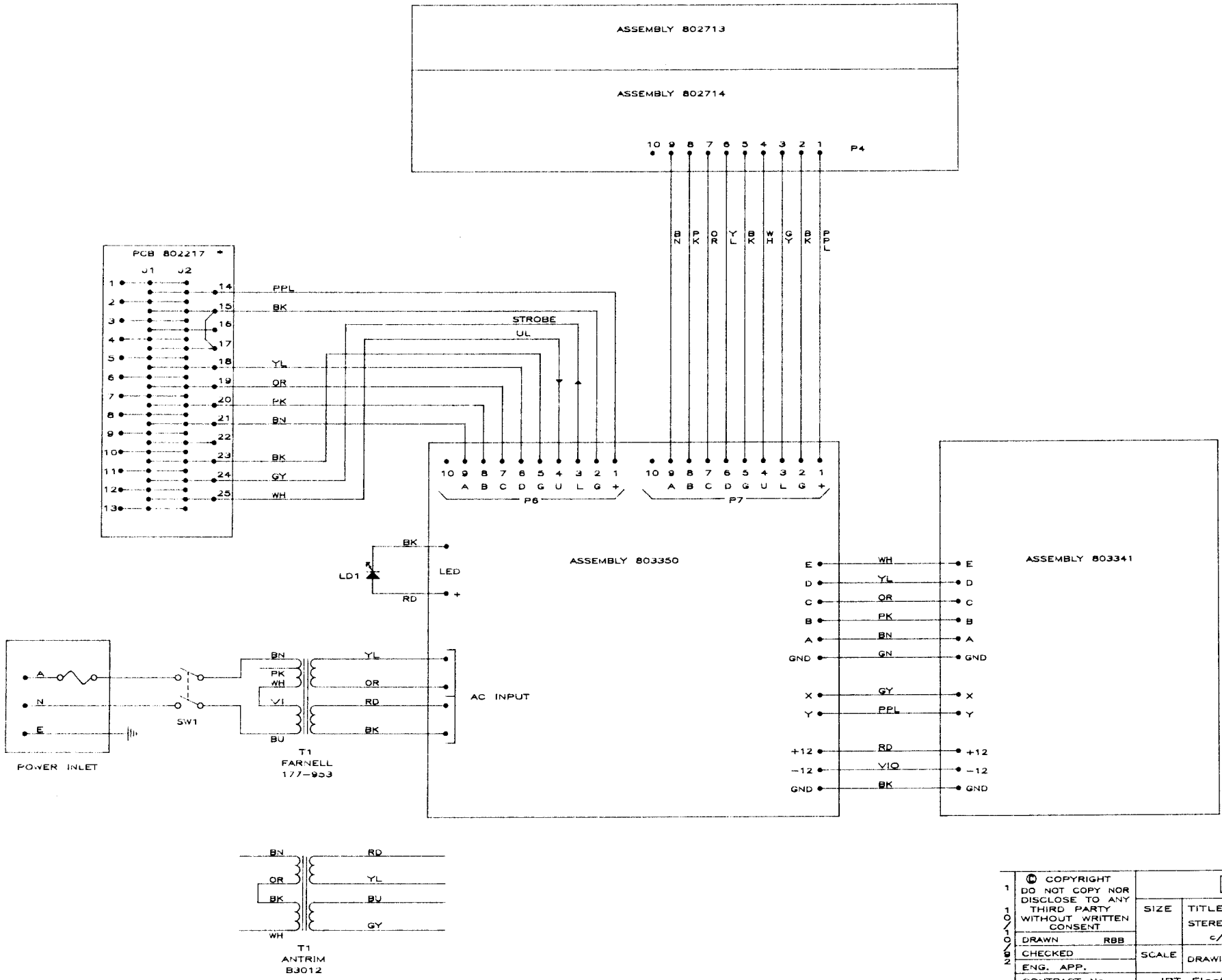
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UL
YL
OR
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STEREO 10x1 AUD SWITCHER c/w CONTROL PANEL
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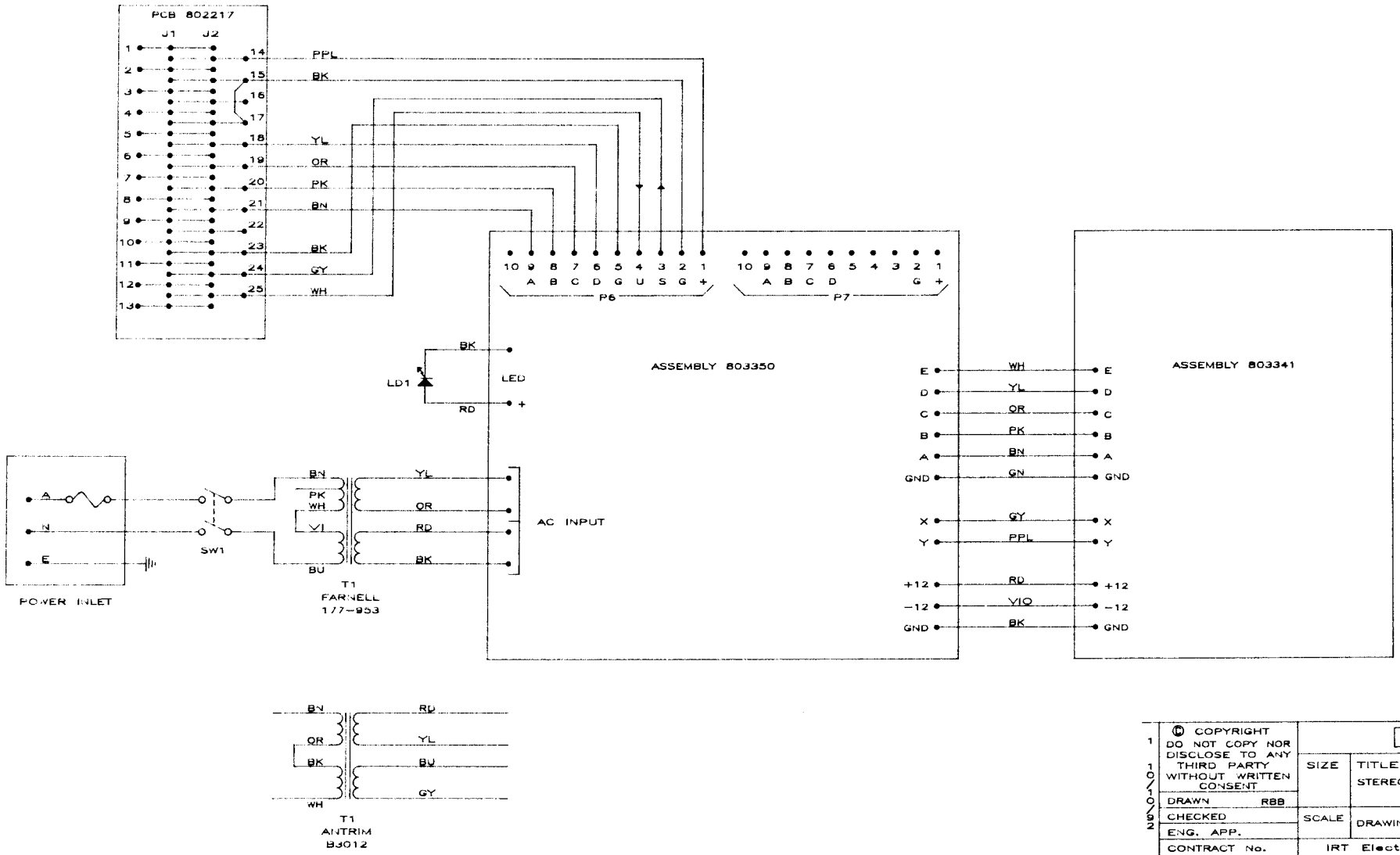

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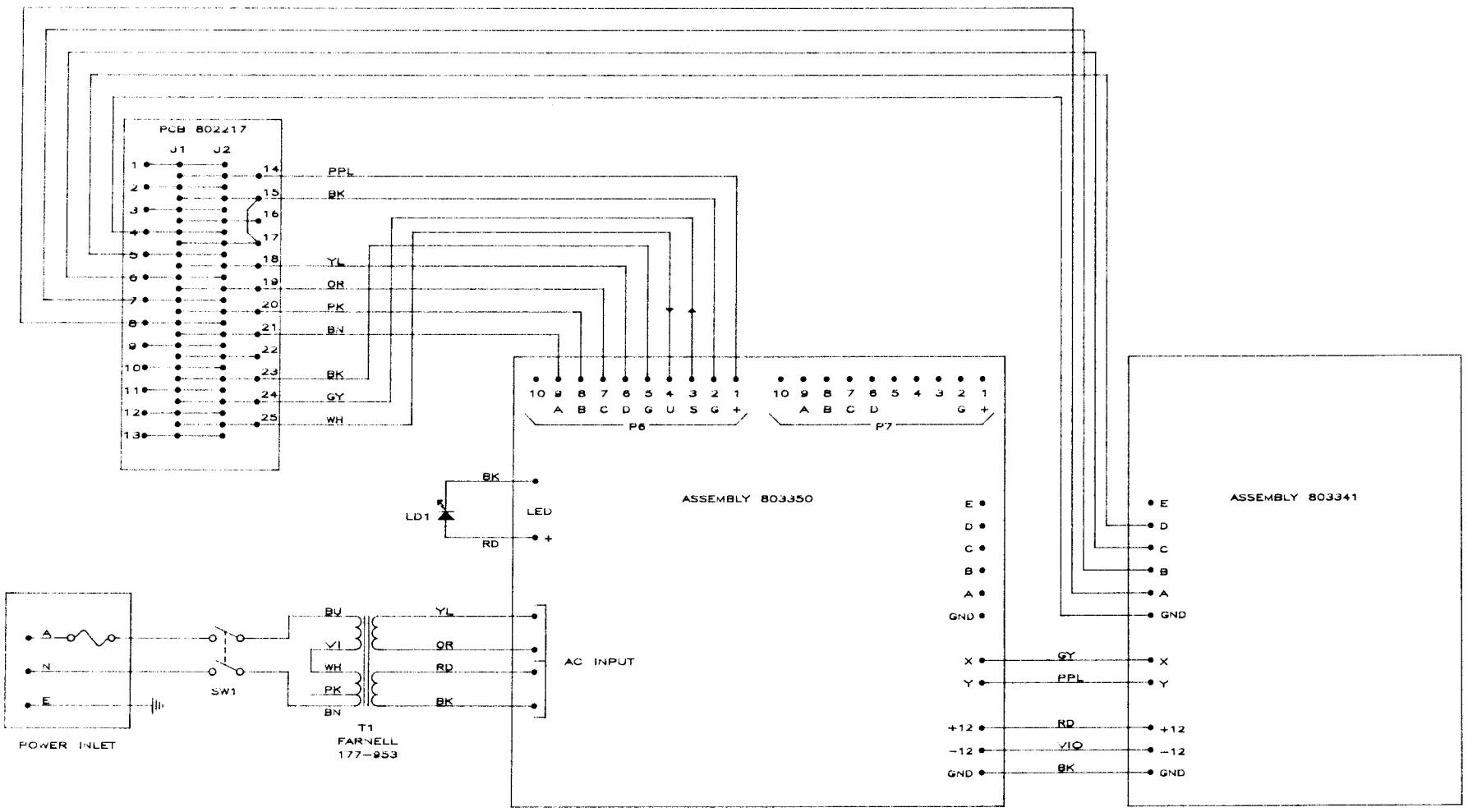

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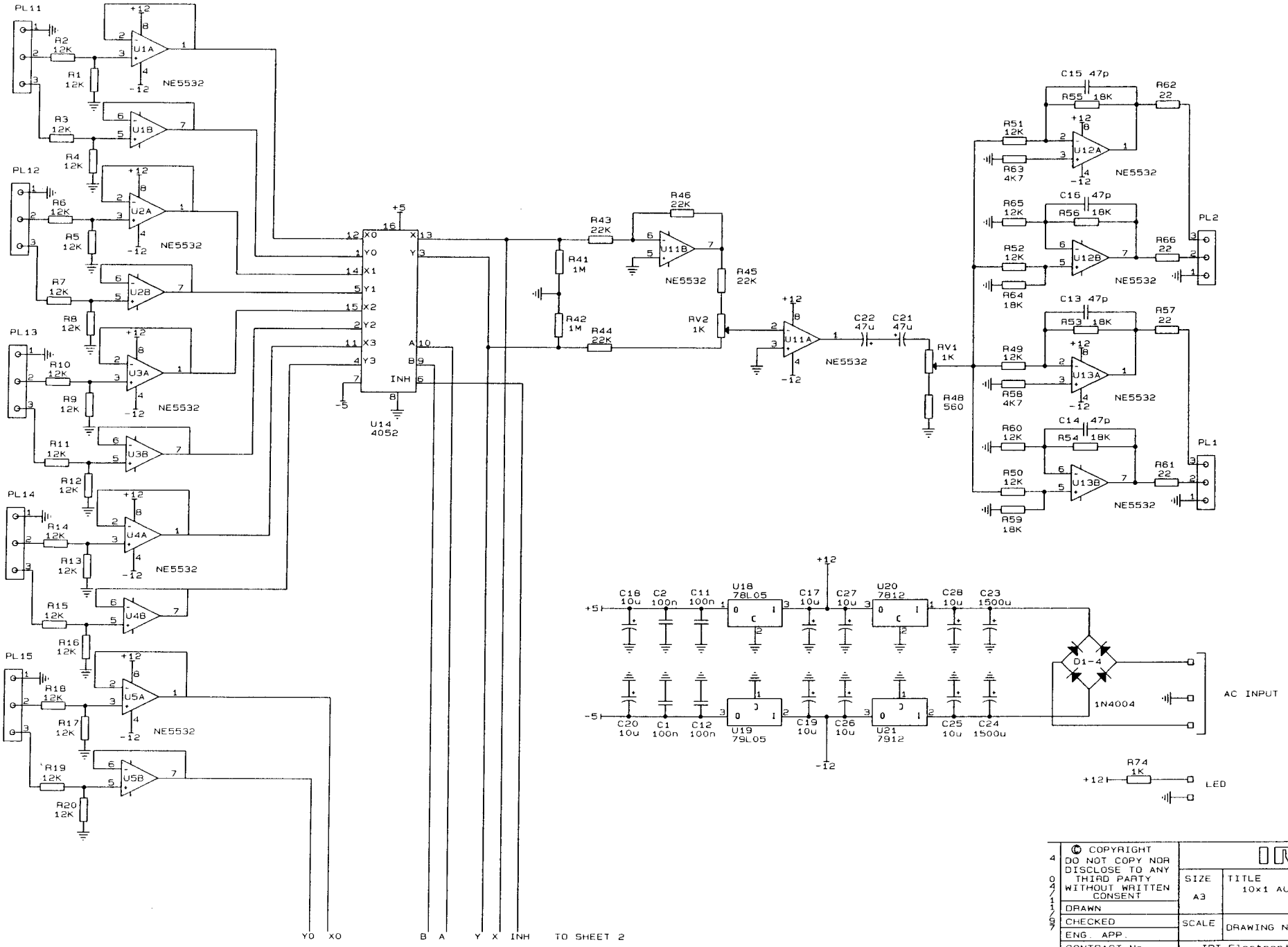

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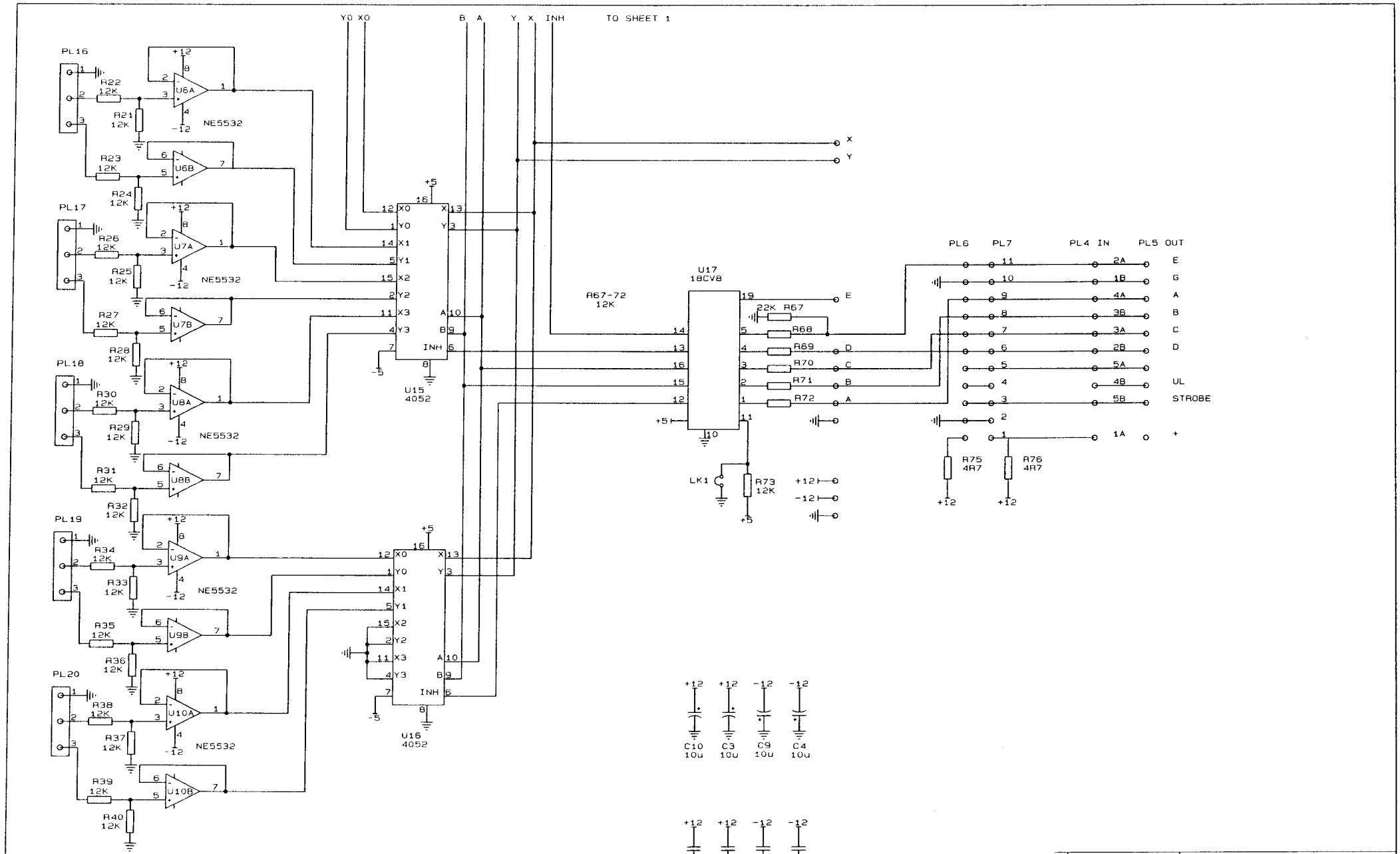

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	ENG. APP.		
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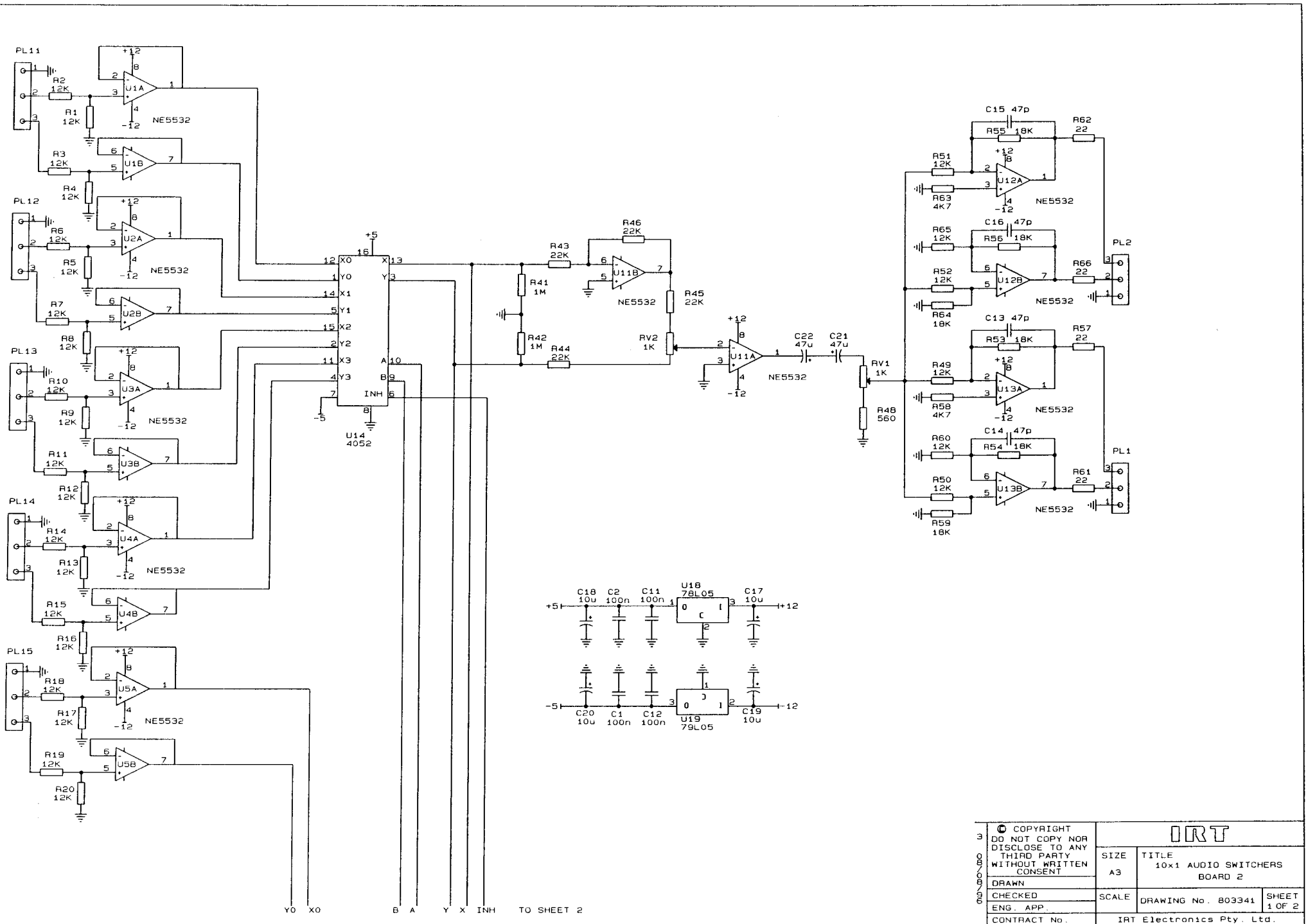

3 08/08/96	
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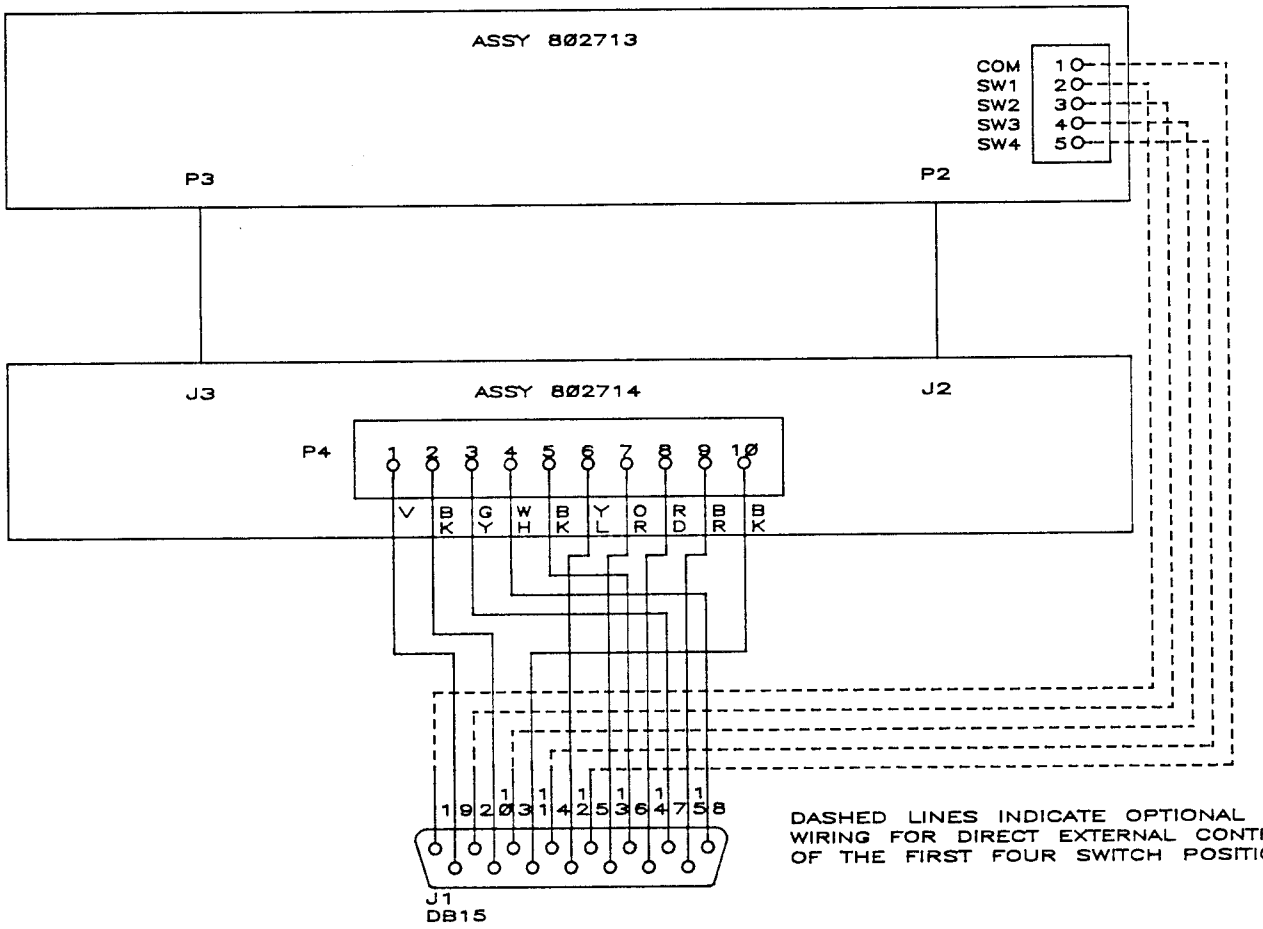
ENG. APP.	
CONTRACT No.	

IRT

SIZE A3	TITLE 10x1 AUDIO SWITCHERS BOARD 2	
SCALE	DRAWING No. 803341	SHEET 1 OF 2

IRT Electronics Pty. Ltd.
ARTARMON NSW AUSTRALIA 2064

NOTE: P1/1 IS THE TOP PAD



DASHED LINES INDICATE OPTIONAL WIRING FOR DIRECT EXTERNAL CONTROL OF THE FIRST FOUR SWITCH POSITIONS.

ORIGINAL ISSUE	3
DATE	30-11-88
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TAPED	
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ENG. APP.	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MM
FRACTIONS DECIMALS ANGLES
± . ± ±

IRT

TITLE
VA-291A
WIRING DIAGRAM

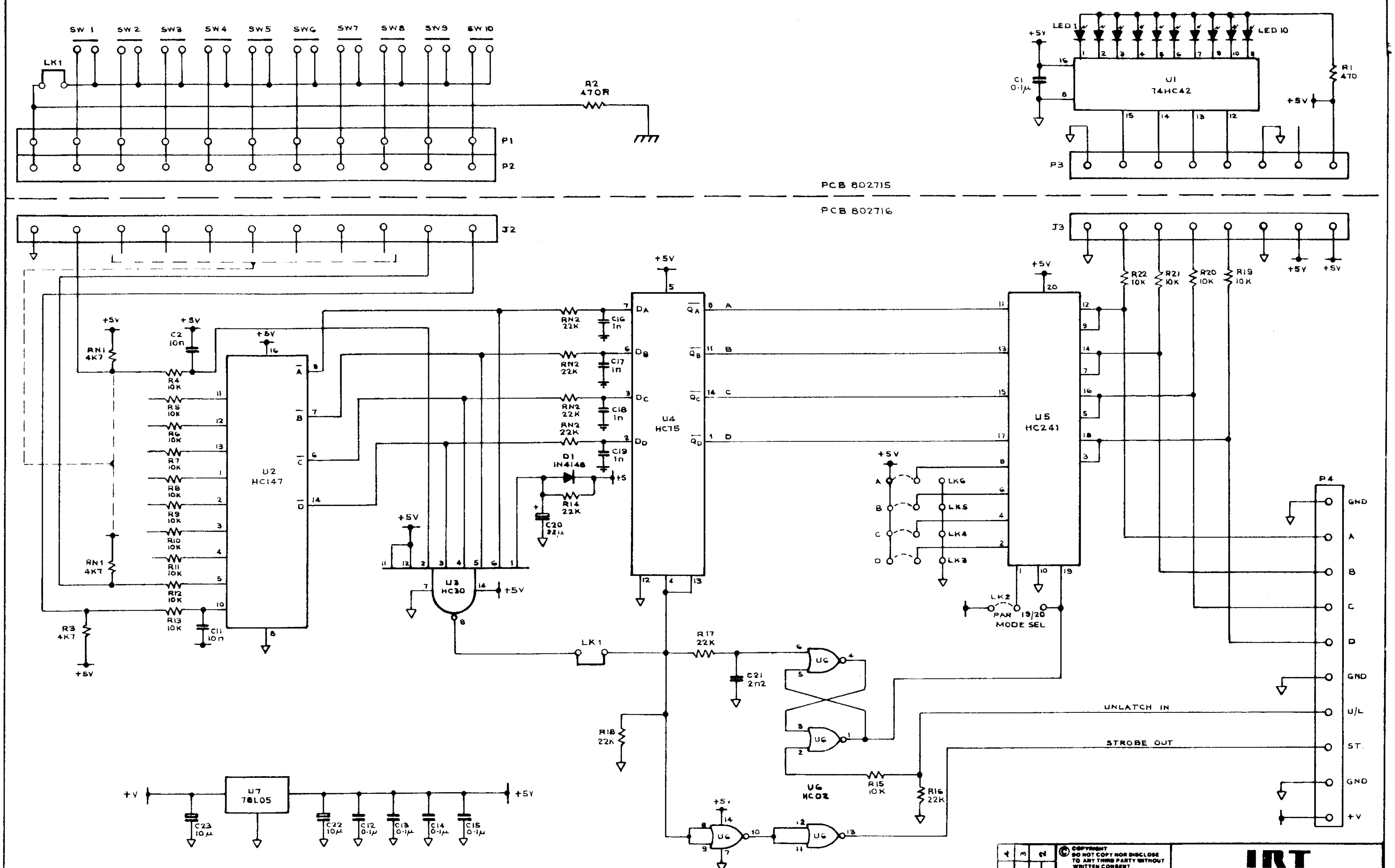
SIZE | SCALE :

CONTRACT NO.

DRAWING NO. 802700

SHEET OF

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



NOTE : See Instruction Book for Links 2 to 6 options

4	3	2	
7 · 8 · 90	28 · 2 · 90	DATE 22 · 2 · 88	ORIGINAL ISSUE

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ENG APP
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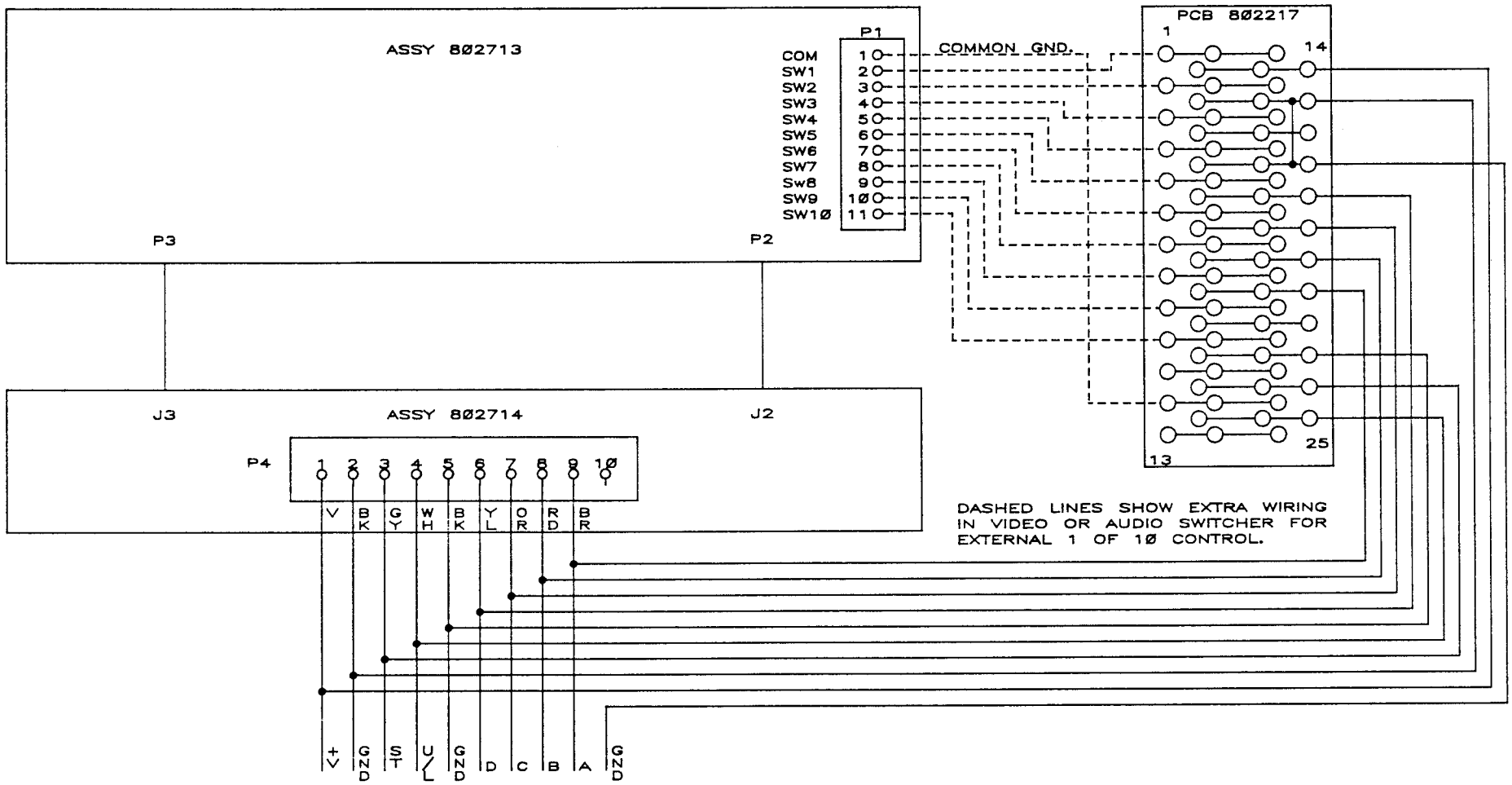
IRT

TITLE VA - 201A
10 x 1 SWITCH PANEL

SIZE | SCALE | CONTRACT NO | DRAWING NO 802730 | SHEET 1 of 1

IRT Electronics Pty Ltd
28 Hotham Pde Artarmon Australia 2064

NOTE: P1/1 IS THE TOP PAD



WIRING TO SWITCHER CONTROL AND POWER CIRCUITS.

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DIMENSIONS ARE IN MM
FRACTIONS DECIMALS ANGLES
: . : :

ORIGINAL ISSUE DATE 08-11-88

IRT

TITLE. SWITCHER EXTERNAL 1 OF 10 CONTROL WIRING DIAGRAM

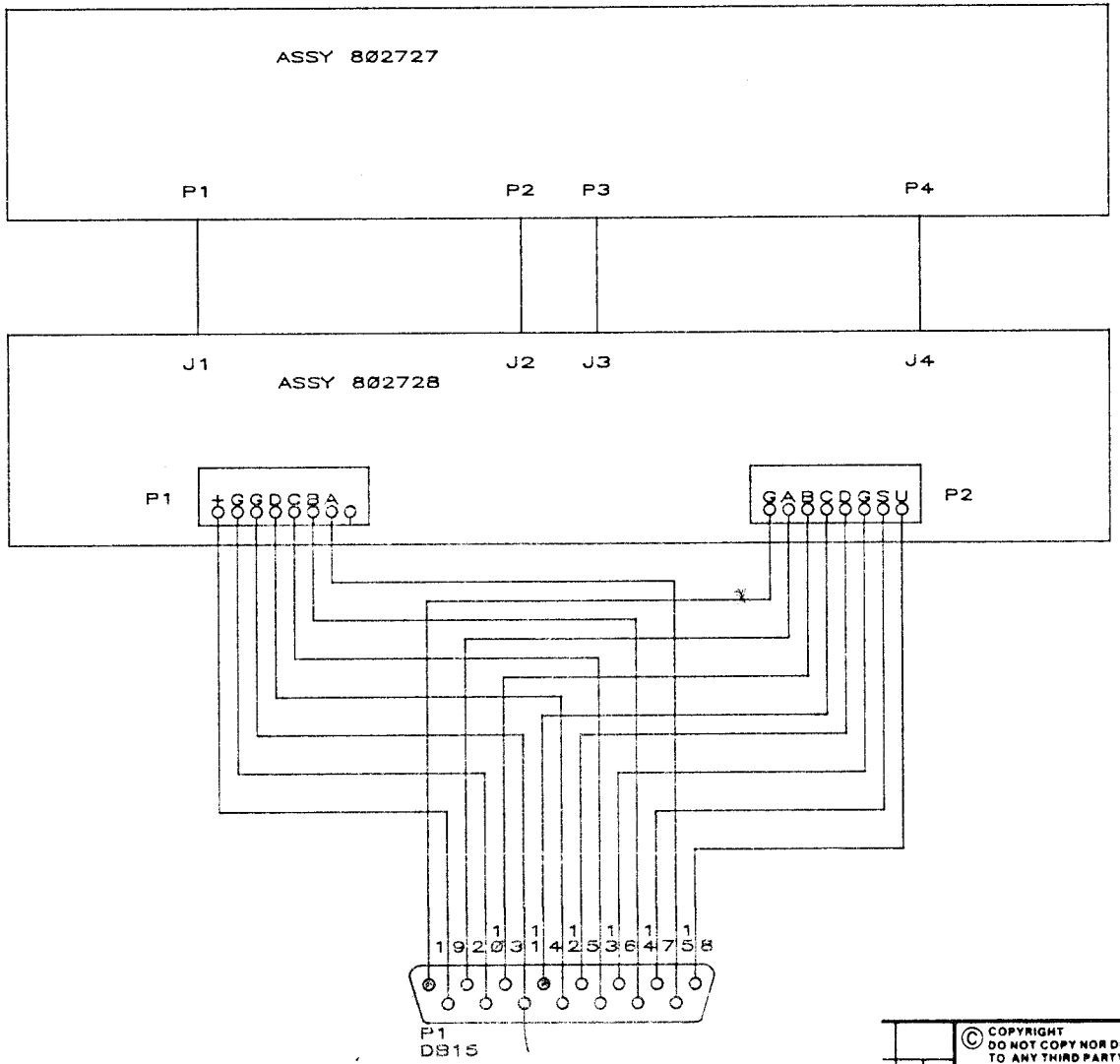
SIZE | SCALE :

CONTRACT NO.

DRAWING NO. 802826

SHEET OF

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



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ENG. APP.	

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DIMENSIONS ARE IN MM
FRACTIONS DECIMALS ANGLES
± . ± ±

ORIGINAL ISSUE
DATE 8-8-82

IRT

TITLE.
VA-292
WIRING DIAGRAM

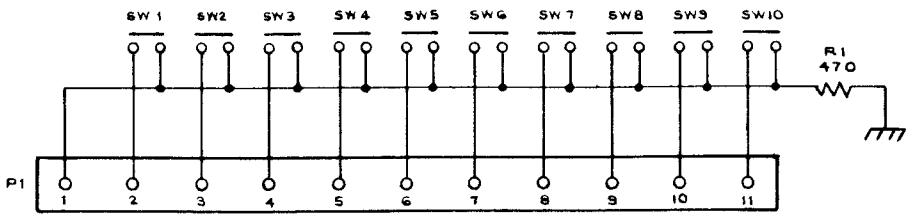
SIZE | SCALE :

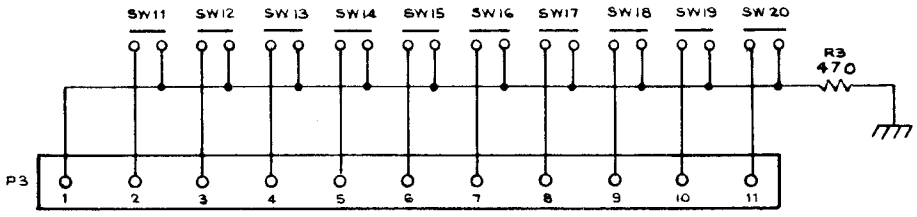
CONTRACT NO.

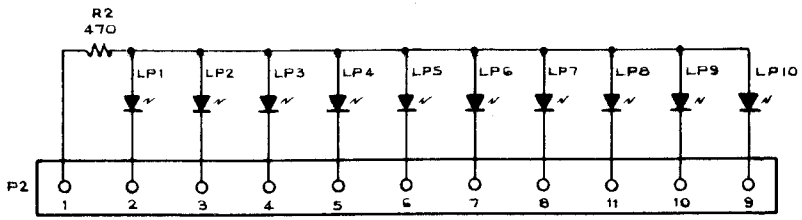
DRAWING NO. 802724

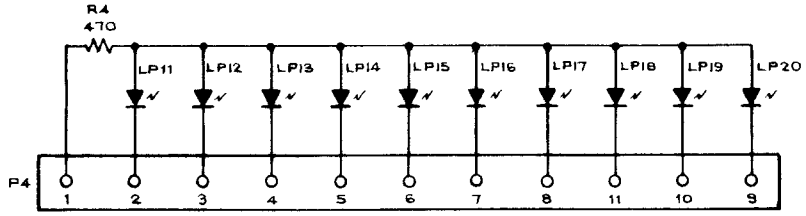
SHEET OF

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









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ENG APP	

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DIMENSIONS ARE IN MM
FRACTIONS DECIMALS ANGLES

ORIGINAL ISSUE 1
DATE 26 2 88

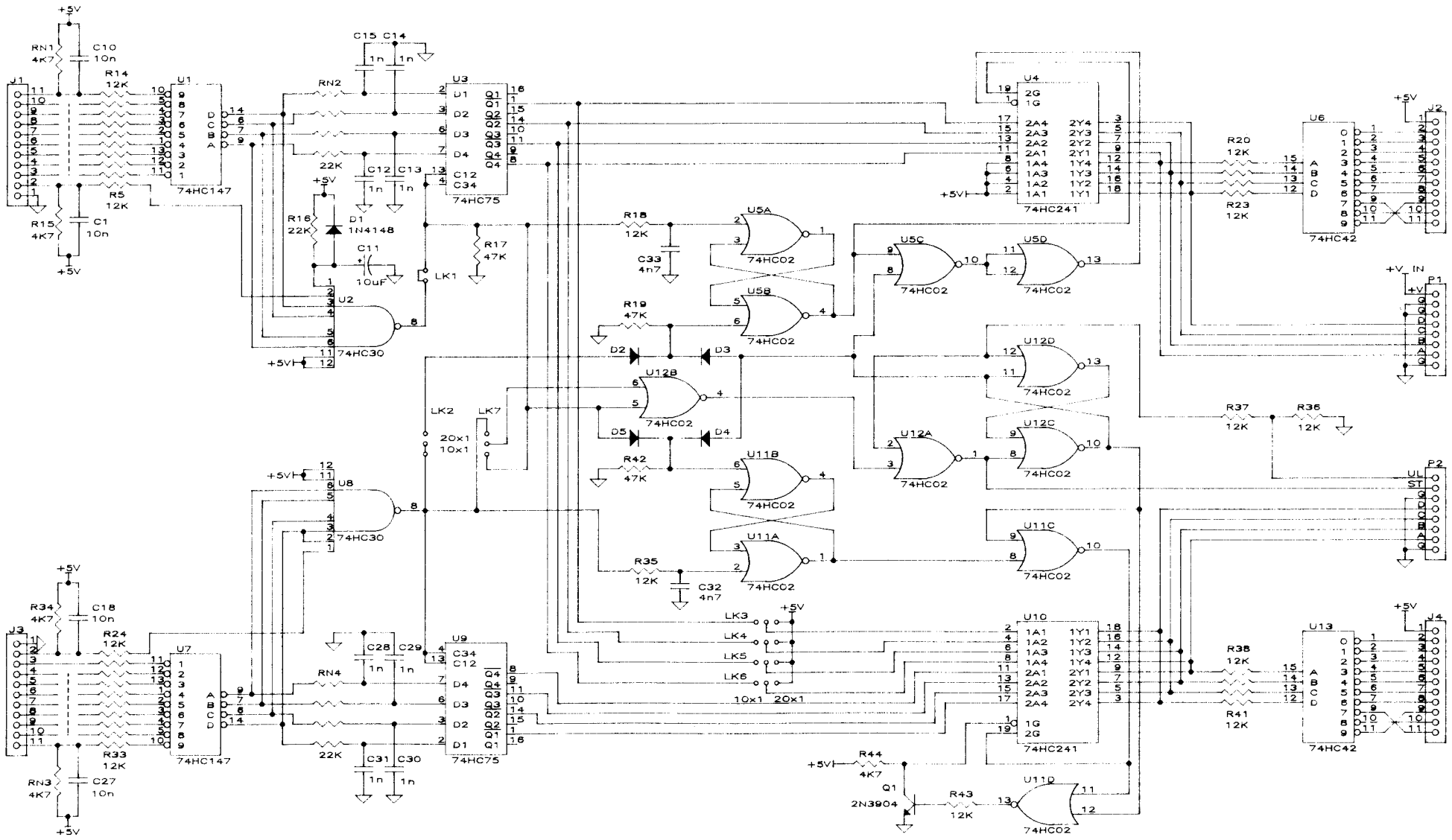
IRT

TITLE
20 x 1 SWITCH PANEL
BOARD 1

SIZE | SCALE

CONTRACT NO | DRAWING NO 802727 | SHEET OF

IRT Electronics Pty Ltd
28 Hotham Pde Artarmon Australia 2064


+5V
RN1 4K7
C10 10n
R14 12K
J1
U1
74HC147
R5 12K
R15 4K7
C1 10n
C15 C14 1n 1n
RN2
22K
C12 C13 1n 1n
U3
74HC75
R16 22K
D1 1N4148
C11 10uF
LK1
R17 47K
U2
74HC30
+5V
R18 12K
C33 4n7
R19 47K
U5A
U5B
74HC02
U5C
U5D
U4
74HC241
R20 12K
R23 12K
U6
74HC42
J2
+V IN
P1
D2
D3
D4
D5
U12B
U12D
U12C
U12A
U11B
U11A
U11C
U11D
R37 12K
R36 12K
R42 47K
R35 12K
C32 4n7
LK2
LK7
20x1
10x1
U8
74HC30
P2
UL
ST
LK3
LK4
LK5
LK6
10x1 20x1
U10
74HC241
R38 12K
R41 12K
U13
74HC42
J4
R34 4K7
C18 10n
R24 12K
U7
74HC147
R33 12K
RN3 4K7
C27 10n
C28 C29 1n 1n
RN4
22K
C31 C30 1n 1n
U9
74HC75
R44 4K7
Q1 2N3904
R43 12K
U14 78L05
C34 TO C42 100n
C17 100n
10uF
C16 10uF
+V IN
NOTE: DIODES 1N4148
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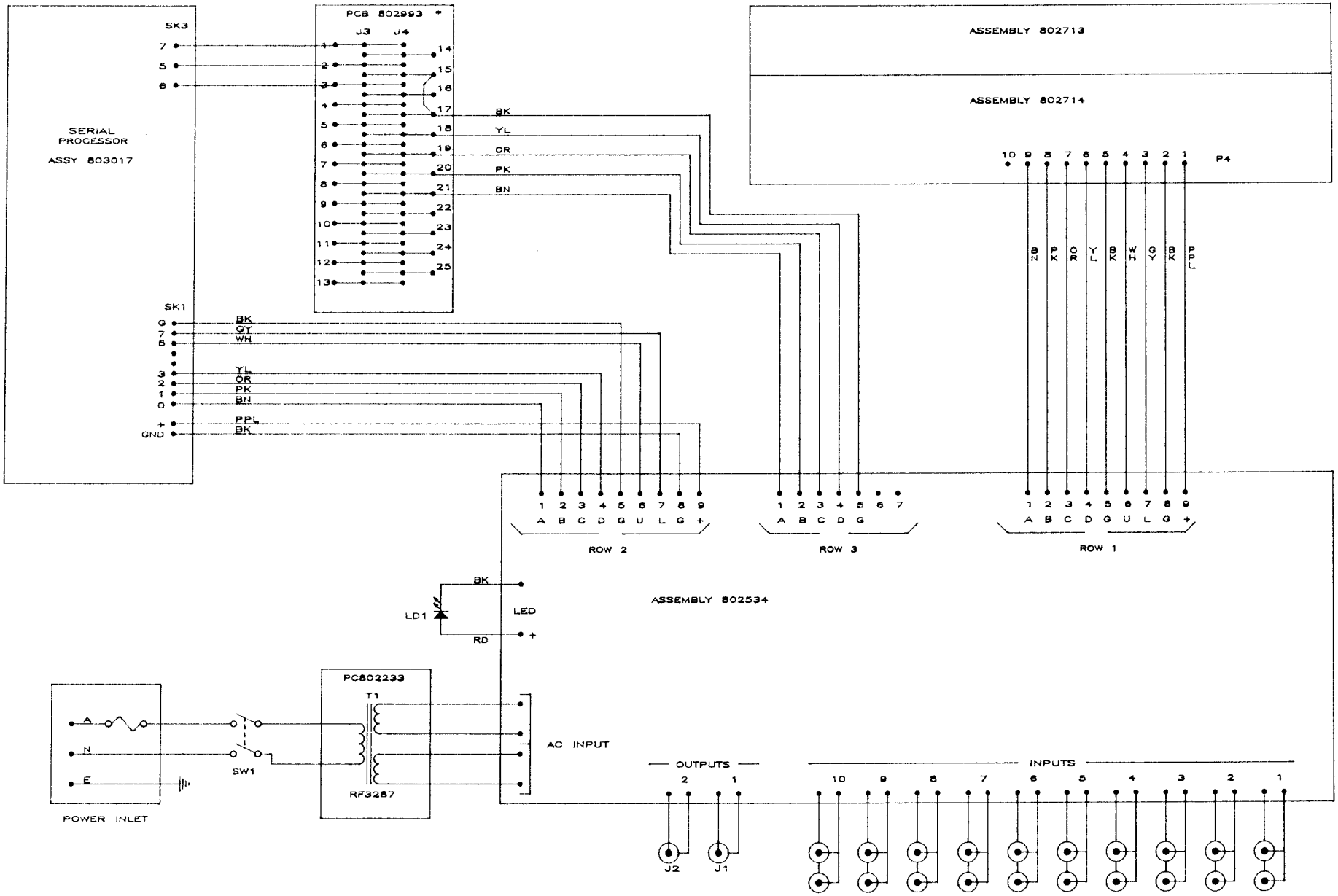
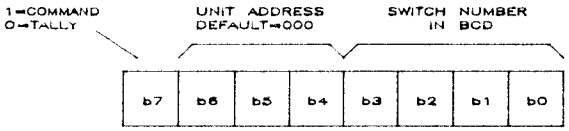
ORIGINAL ISSUE
DATE
IRT
TITLE
VA-292 20x1 SWITCH PANEL BOARD 2
SIZE SCALE
CONTRACT NO
DRAWING NO 802728
SHEET OF
IRT Electronics Pty Ltd 26 Holman Rde Alfarmon Australia 2064





INPUT CONTROL WORD FOR SERIAL CONTROL

SPEED = 9600 BAUD

BITS = 8

PARITY = 0

FOR UNITS GREATER THAN S/N 9404000

DRAWN RBB

CHECKED

ENG. APP.

CONTRACT No.

IRT

SIZE

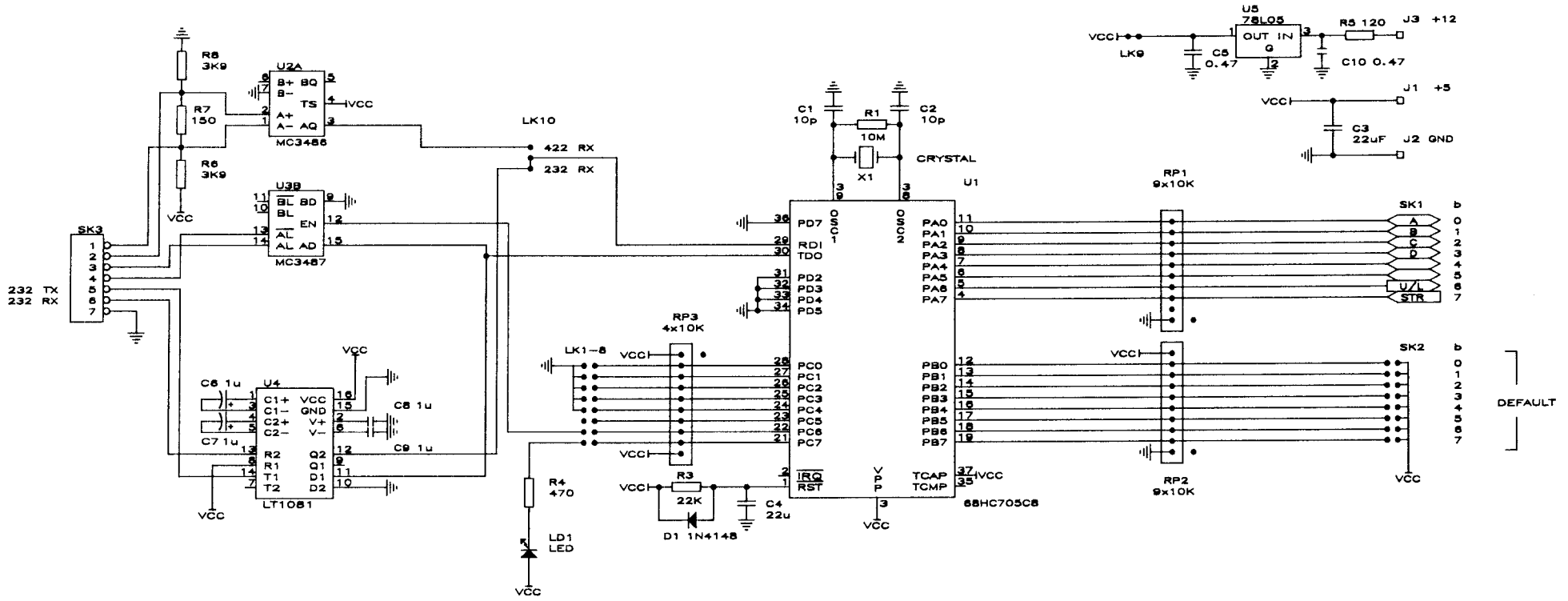
TITLE VA-400
10x1 VIDEO SWITCHER
WITH PROCESSOR

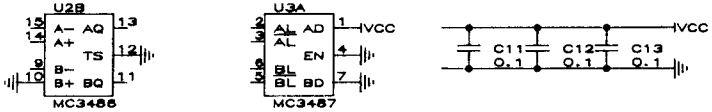
SCALE

DRAWING No. 803270

SHEET 1 OF 2

IRT Electronics Pty. Ltd.
ARTARMON NSW AUSTRALIA 2064





LK1	LK2	LK3	LK4	LK5	LK6	LK7	LK8
ADDRESS			PROG TYPE *			422 EN	LOOP LAMP

* LK4 IN = SWITCHER PROGRAM
LK4 OUT = CONTROL PANEL PROGRAM

LK5 IN = CYCLING PROGRAM
LK5 OUT = SWITCHER/CP PROGRAM

CYCLING PROGRAM DEFAULTS

SK2 b0–3 SET THE HIGHEST CROSSPOINT IN THE CYCLE

SK2 b4–7 SET THE DURATION OF EACH STEP IN 4 SECOND INCREMENTS

A LINK IN IS A 1, LINK OUT IS 0.

DRAWN
CHECKED
ENG. APP.
CONTRACT No.

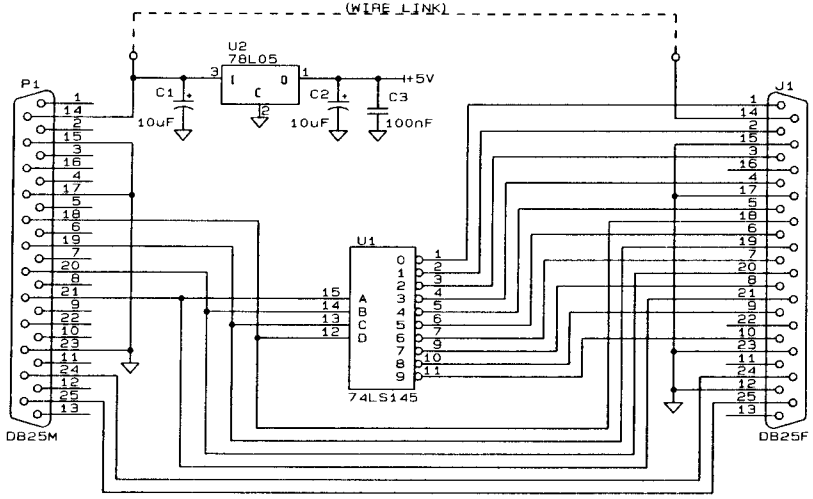
IRT

SIZE | TITLE SERIAL CONTROL FOR VA-400/410

SCALE | DRAWING No. 803017 | SHEET 1 OF 1

IRT Electronics Pty. Ltd.
ARTARMON NSW AUSTRALIA 2064

PCB 803018



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CHECKED	
ENG. APP.	
CONTRACT No.	

IRT

SIZE A3	TITLE 10x1 SWITCHER TALLY DECODER	
SCALE	DRAWING No. 803089	SHEET 1 OF 1

IRT Electronics Pty. Ltd.
ARTARMON NSW AUSTRALIA 2064

1 19/06/90