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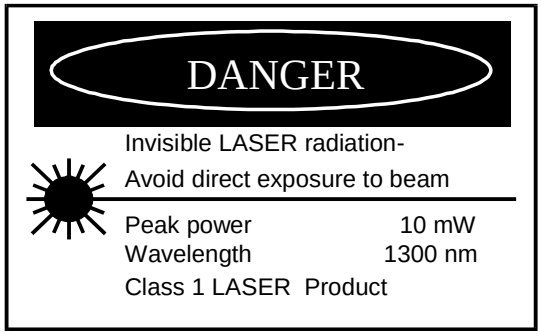
IRT 1 RU
Types
VA-391 Optical Transmitter
Serial Item 352/67
&
VA-392 Optical Receiver
Serial Item 352/68



Designed and manufactured in Australia

IRT can be found on the Internet at:
http://www.irtelectronics.com

IRT 1 RU
Types
VA-391 Optical Transmitter
&
VA-392 Optical Receiver

Instruction Book

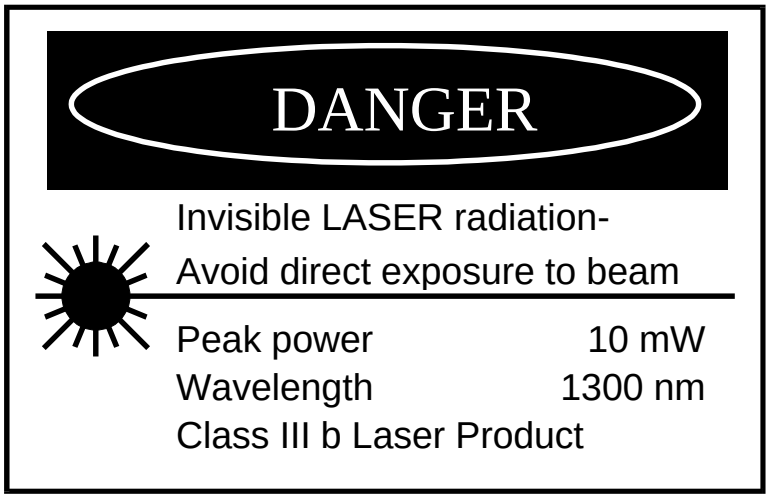
Table of Contents

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

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.



Optical Safety

The light emitted from the laser diode used in this system is invisible and may be harmful to the human eye. Avoid looking directly into the fibre optic cable or connectors or into the collimated beam along their axis when the device is in operation. Operating the laser diode outside of its maximum ratings may cause device failure or a safety hazard.

General Description

The optical transmission system comprises a VA-391 transmitter and a VA-392 receiver, each requiring 1 RU (1 Rack Unit -= 1.75” or 44 mm) of 19" rack mounting space. Both units are based on the VA-390 modular optical transmission system. The VA-391 and VA-392 provide optical transmission and reception of one channel of video and additionally can be configured to carry up to four channels of audio. The system has been designed to operate in the second window (1300 nm region) and to use single mode optical fibre.

Front Panel
The front panels of the VA-391 and VA-392 have the same format. The power ON switch appears on the right hand side of the panel. The status indicators appear to the left of the IRT logo. Next to these is a gain control and monitor output. On the VA-391 an adjustment for cable equalisation also appears. These two adjustments, gain and equalisation, are the only operational adjustments provided.

Rear panel
The system inputs and outputs appear on the rear panels. On the VA-391 transmitter the video input is via two looping BNC connectors on the right of the rear panel. The unused input must either be terminated by 75 Ohms or may be used as a signal loop to another terminated video input. There are four XLR female sockets for audio input. In the middle of these is a 15 way D connector for alarm outputs and clamp control input. To the left of the audio inputs is a DIN 47256 standard connector for optical output. Next to this, the fused mains input. On the VA-392, the connector positions are the same but the video, audio, and optical signal flow is reversed. In this case the XLR connectors are male.

Links are available in the appropriate unit to allow for :-
- The insertion or removal of the audio sub-carrier and associated filters from the system.
- The muting of the video and audio outputs upon receiver signal loss.

The system has been designed to operate within the specification for optical path losses up to 24 dB. For safety reasons, the optical power has been restricted to -10 dBm with an alarm indicating any increase above -7 dBm.

The system uses a wide band FM modulator capable of modulating baseband signals from 20 Hz to 12 MHz (-1 dB). This allows for the addition to the video of two FM sub-carriers of 7.5 and 8.3 MHz for the carrying of two high quality audio channels suitable for stereo operation. Further FM sub-carriers may be included to provide up to two more audio channels. The audio can be disabled and the audio/video separation filters removed to allow wide-band operation, should this be required.

Standard features:

- Input and output video signal gain adjustable from front panel
- Input cable equalisation 0 to 100 metres
- Video clamp on the back porch of the video input
- Video clamp on the back porch of the video output
- The VA-392 video and audio output is muted on loss of signal
- Front panel alarms indicate optical signal losses and proper transmission and reception of the video signal.
- Opto-isolated alarm signals are provided.
- Selectable 5 MHz video bandwidth with audio or 10 MHz bandwidth with no audio.

CAUTION

Linearity adjustments on the modulator and demodulator should not be altered. Any alterations to these adjustments may adversely affect the system performance. All adjustments for normal operation of the equipment are available on the front panels.

Equipment provided:

Standard:

VA-391 Optical transmitter.
or
VA-392 Optical receiver.

Optional:

VA-391AM single channel audio modulator.
Up to 4 audio channels may be fitted. When modules are to be fitted to existing units care should be taken to ensure that correct subcarrier frequencies are selected. Please consult factory for advice.

VA-392AD single channel audio de-modulator.
Up to 4 audio channels may be fitted. When modules are to be fitted to existing units care should be taken to ensure that correct subcarrier frequencies are selected. Please consult factory for advice.

Note: Telecom units are supplied with two audio channels fitted with subcarrier frequencies of 7.5 & 8.3 MHz and may not be fitted with additional audio channels without changing these original modules.

Accessories available:-

VA-393 Portable transmitter	Compatible portable optical transmitter for use with VA-392 optical receiver. (Up to two audio channels only.)
VA-394 Portable receiver	Compatible portable optical receiver for use with VA-391 optical transmitter. (Up to two audio channels only.)
VA-500 Eurocard series fibre optic modules	Consult factory for advice on compatible modules in this series. Whilst providing an inexpensive and compact system this series does not have all the features of the VA-391 / VA-392 combination.

Instruction Book.

Technical Specifications

IRT 1 RU Types
VA-391 Optical Transmitter
&
VA-392 Optical Receiver

The following performance data is for optical path losses of 0 to 24 dB with an optical power output of -10 dBm (0.1 mW) and with pre-emphasis and de-emphasis connected. Band stop filters are inserted.

Video: (at a video input level of 1V p-p.)

Input & output connectors	BNC
Insertion gain	<±0.2 dB
Noise	
To CCIR Rec 567-1	
Continuous random noise	<-63 dB RMS
Periodic noise	
Power supply hum	
(including harmonics)	<-45 dB
1 KHz to 5.5 MHz	<-60 dB
Overall gain	< Unity ±3 dB
Adjustable from front panel	
Frequency response	±0.1 dB to 5 MHz
	±0.5 dB to 10 MHz (no Audio)
Differential gain at 4.43 MHz	<1.0%
Differential phase at 4.43 MHz	<1.0%
Pulse to bar K-factor	<=0.5%K
Luminance/chrominance inequality	
Delay	<20 ns
Gain	<2%

VA-391 video input characteristics:

Input impedance	Looping bridging
Input signal:	Composite or a MAC style of signal.
Input common mode rejection	>40 dB

VA-392 video output characteristics:

Output Impedance	75 Ω

Audio:

Inputs: (VA-391)

Number:	Telecom specification	2
	Standard specification	0, 1, 2, 3 or 4 channels may be fitted
Connectors		XLR
		Pin 1 Ground
		Pin 2 +
		Pin 3 -
Input impedance		600 Ω, balanced
Type		Tranformerless
Nominal input level		+8 dBm
Max. input level		+14 dBm for quoted distortion.
Input gain range		±3 dB
Input common mode		>50 dB, 20 Hz to 20 KHz

Outputs: (VA-392)

Number:	Telecom specification	2
	Standard specification	0, 1, 2, 3 or 4 channels may be fitted
Connectors		XLR
		Pin 1 Ground
		Pin 2 +
		Pin 3 -
Type		Transformerless, balanced
Output impedance		≈40 Ω, balanced
		(aligned for load impedances of 600 Ω or greater.)
Nominal output level		+8 dBm
Output gain range		±3 dB
Max. output Level		+20 dBm 600 Ω load
DC on output		<± 10 mV

Link Performance: (VA-391 - VA-392)

Subcarrier frequencies:	
Telecom specification:	7.5 MHz
	8.3 MHz
Standard specification:	7.36 MHz
	7.765 MHz
	8.215 MHz
	8.71 MHz
Frequency response	+0.15/-0.75 dB (30 Hz to 15 KHz)
Total harmonic distortion measured @	
+17 dBm < 4 KHz, +14 dBm => 4 KHz	
30 Hz to 7.5 KHz	<0.2 %
Intelligible crosstalk ratio	>80 dB, 30 Hz to 15 KHz
Gain difference between channels	
30 Hz to 10 KHz	<0.2 dB
10 KHz to 14 KHz	<0.4 dB
14 KHz to 15 KHz	<0.8 dB
Phase difference between channels	
30 Hz to 4 KHz	<3.75^{o}
14 KHz	<7.5^{o}
15 KHz	<10^{o}
Noise	<-52 dBm, 30 Hz to 15 KHz

Optical:

Input / output connectors	DIN 47256
Laser wavelength	1300 nm
Launch power	-10 dBm (Single mode cable)
Path loss	Up to 24 dB path attenuation allowable to meet published specification

Alarms:

Connector		15 Pin D-connector on rear panel (shared with control inputs)
Front panel LED & rear panel opto isolated outputs for:		
VA-391	Laser high power	Laser > -7 dBm output power
	Laser fail	Laser < -15 dBm output power
	Video input fail	No vertical block detected.
VA-392	Receiver loss	Optical input < -26 dBm
	Video / audio mute	Output muted due to receiver loss
	Video output fail	No vertical block detected at output

Control inputs:

Connector		15 Pin D-connector on rear panel (shared with alarm outputs)
VA-391	Clamp disable	Disables clamping of video input signal
	Wideband switching	LPF bypassed and audio subcarriers turned off
VA-392	Clamp disable	Disables clamping of video input signal
	Wideband switching	LPF bypassed and audio outputs muted

Power:

Requirements	240 Vac or - 48 Vdc
Power consumption	100 mA @ 240 Vac 500 mA @ -48 Vdc
Input fuse ratings:	
240 Vac	250 mA slow blow type
-48 Vdc	2 A

Input connectors:

240 Vac	IEC320
-48 Vdc	Klippon MK 1/3 3 pin term block #2616

Other:

Temperature range		0 - 50° C ambient
Mechanical		Suitable for mounting in 19" rack enclosures with input, output and power connections on the rear panel
Finish:	Front panel	Grey enamel, silk screened black lettering & red IRT logo.
	Rear & case	Natural anodised aluminium with silk screened black lettering.
Dimensions :		
	Height	44.5 mm
	Width (including mounting bracket)	483 mm
	Depth	445 mm
Standard accessories		IEC power lead Optical connector protective cover
Optional accessories		Instruction manual

Brief Technical Description

The VA-391/VA-392 transmitter / receiver pair is a single mode fibre optic link operating at 1300 nm meeting Telecom Australia 5 Vc (local link) performance with fibre losses of up to 24 dB.

Refer to the block diagram of the transmitter provided.

The video input is amplified, pre-emphasised and back porch clamped. In order to reduce any unwanted signal at frequencies above the video bandwidth that would appear at the audio output, the video signal is passed through a low pass filter that attenuates at audio subcarrier frequencies prior to the insertion of the audio subcarriers.

The audio subcarriers for the audio channels are generated by varactor modulators operating at the required subcarrier frequencies (2 channels at 7.5 MHz and 8.3 MHz for Telecom Australia specification or up to four channels at 7.36 MHz, 7.765 MHz, 8.215 MHz & 8.71 MHz for standard specification). The audio from the input is emphasised prior to modulating the subcarriers. Stability of these modulators is of paramount importance to ensure that maximum deviation can be achieved and to simplify insertion and extraction from the video without video degradation.

The video and the audio subcarriers are then pre-emphasised and used to modulate a wide band modulator which has excellent linearity over the full modulation bandwidth . The modulator frequency, without deviation, is approximately 30 MHz.

The modulated signal then drives the low powered laser that has been optically output stabilised using the detection diode integrated into the laser housing. The optical power output is set to -10 dBm and connected to the external fibre cable via a DIN 47256 connector.

Refer to the block diagram of the receiver provided.

The optical signal received at the receiver is connected via a DIN 47256 connector to an avalanche photo diode (APD). The APD has a DC voltage connected to it that varies with the input light level. This voltage rises to a maximum across the APD at low light level. The DC maximum is set to be just below the point of APD avalanche to achieve the optimum signal to noise ratio. The signal detected by the APD is then amplified and fed to an AGC amplifier which maintains a constant RF output level over the received optical signal range. The signal is then fed to a limiter and demodulator.

The output from the discriminator first band limited to 14 MHz. It is then amplified, de-emphasised and then passed to a splitting circuit that extracts the audio subcarriers.

The video signal is low pass filtered to remove the audio subcarriers and clamped before passing to the video output via the mute switch.

The audio subcarriers from the splitter are fed to the audio demodulator circuits (2 channels at 7.5 MHz and 8.3 MHz for Telecom Australia specification or up to four channels at 7.36 MHz, 7.765 MHz, 8.215 MHz & 8.71 MHz for standard specification). Each subcarrier is filtered, and mixed using a crystal oscillator to give an IF of approximately 10.7 MHz. The signal is then limited, quadrature demodulated using dual tuned circuits for linearity. The audio output from the demodulator is de-emphasised, low pass filtered at 15 KHz, amplified and finally electronically balanced.

Internal Adjustments

The VA-391 and VA-392 are factory aligned for optimum performance using sophisticated test equipment that is not normally accessible to end users. Changing any internal settings without access to this equipment will result in a detrimental effect on performance.

In the event of any malfunction or degradation in performance the user should contact IRT for information and advice before attempting any repairs or adjustments.

Operational adjustments

The only adjustments necessary for proper operation of the VA-391, VA-392 are input gain and cable equalisation.

Input Gain: The gain on the VA-391 front panel should be adjusted so that the video signal at the VA-391 MONITOR output is 1 Vp-p (sync. tip to Bar top.)

Cable Equalisation. If a long run of cable is used to feed the input to the VA-391 then the cable equaliser should be adjusted to give a properly equalised video signal at the MONITOR output on the VA-391.

The VA-391 video input must be terminated in 75 Ω.

Configuration

Refer to the block diagrams provided.

Remote wideband switching facility:

VA-391/VA-392 units with serial no. 9203033 and above are fitted with additional components to facilitate wide band/video + audio selection from the rear panel.

When this is done the following operations are effective:

VA-391- Connect pin 9 of the rear panel D-connector to ground (pin 1) to bypass the video bandstop filter allowing wideband (10 MHz) operation of the unit. The audio subcarriers are also turned off.

VA-392 - Connect pin 9 of the rear panel D-connector to ground (pin 1) to bypass the video bandstop filter allowing wideband (10 MHz) operation of the unit. The audio outputs are also muted.

Note:
Units with this feature must only have the following video filters installed:

Video LPF assy 803112 Issue 3 and higher
Video BSF assy 803023 Issue 3 and higher

Insertion of earlier issues of either assy 803112 or 803023 will result in loss of audio signals.

Link locations and functions:

Refer to the block diagrams. The links, when inserted, provide the following connections:

VA-391

LK 1 to LK 4	Audio pre-emphasis - **Do not remove.**
LK 5	Combined video/audio subcarriers to baseband modulator.
LK 6	Not used.
LK 7	Audio subcarriers to combiner. position ON/OFF
LK 8-11	Audio modulators to audio RF mixer.
LK 12	External subcarrier input. Not used.
CLAMP	OFF position disables clamp and rear panel control. ON position enables control of clamp from rear panel.

VA-392

LK 1	Not used.
LK 2	Video de-emphasis - **Do not remove**.
LK 3	Audio and video mute on loss of received RF signal.
LK 4	Video fail indicator from rear panel alarm output activated by mute condition. If this link is removed, the video fail condition only occurs when the vertical block is lost.
LK 5 to LK 8	Audio de-emphasis. **Do not remove**.
LK 9 to LK 12	Audio subcarrier RF splitter to audio demodulators
LK 13	External subcarrier output. Not used.
CLAMP	OFF position disables clamp and rear panel control. ON position enables control of clamp from rear panel.

VA-391 optical transmitter link settings.

	Note 1 Video + 1 sound	Note 1 Video + 2 sound	Note 1 Video + 3 sound	Note 1 Video + 4 sound	Note 2 Wideband video
LK 1	I	I	I	I	X
LK 2	X	I	I	I	X
LK 3	X	X	I	I	X
LK 4	X	X	X	I	X
LK 5	I	I	I	I	I
LK 6	NI	NI	NI	NI	NI
LK 7	NI	I	I	I	NI
LK 8	NI	I	I	I	NI
LK 9	NI	I	I	I	NI
LK 10	NI	NI	I	I	NI
LK 11	NI	NI	NI	I	NI
LK 12	NI	NI	NI	NI	NI
LK 13	NI	NI	NI	NI	NI
LK 14					

VA-392 optical receiver link settings.

	Note 1 Video + 1 sound	Note 1 Video + 2 sound	Note 1 Video + 3 sound	Note 1 Video + 4 sound	Note 2 Wideband video
LK 1	NI	NI	NI	NI	NI
LK 2	I	I	I	I	I
LK 3	I Note 3	I Note 3	I Note 3	I Note 3	I Note 3
LK 4	NI	NI	NI	NI	NI
LK 5	I	I	I	I	X
LK 6	X	I	I	I	X
LK 7	X	X	I	I	X
LK 8	X	X	X	I	X
LK 9	I	I	I	I	NI
LK 10	NI	I	I	I	NI
LK 11	NI	NI	I	I	NI
LK 12	NI	NI	NI	I	NI
LK 13	NI	NI	NI	NI	NI
LK 14	NI	NI	NI	NI	NI

I = Link inserted
NI = Link not installed
X = Don't care

Note 1 Depending on the number of audio channels, the video filter may need to be altered. Two and three audio channels could be accommodated using the band stop filter. Four channels or those systems requiring widely separated sub-carrier frequencies would require low pass filters in both the VA-391 and VA-392.

Note 2 For wide-band applications the video filters in both the VA-391 and VA-392 must be removed and each replaced by a 75Ω pad (Assembly 803306 is recommended for this purpose). If B-MAC is to pass through the VA-391/VA-392 then the video clamps should be inhibited.

Note 3 Can be used without the link being inserted. The noise performance, however, degrades continually with the path attenuation after approximately 24 dB. The mute will operate if connected in the range 26 to 32 dB path attenuation.

Alarms

The alarm outputs are available from the rear panel of the VA-391 and VA-392 at the connector labelled 'ALARM OUTPUTS'. The alarms consist of unterminated 4N33 opto-couplers which can form the switch in an alarm circuit to suit the needs of the user. For instance, if a LED alarm is required then the emitter of the 4N33 can be connected to ground while the collector is connected to a suitable voltage via a load resistor.

The alarms available in the VA-391 are:

Laser High Power. This is triggered when the laser exceeds -7 dBm output power. A LED ,labelled 'HI PWR', is turned ON, on the front panel and an opto-coupler is activated. Pin 11 is the emitter, pin 4 is the collector of the 4N33.

Laser Fail. If the current drawn by the optics laser drops below a threshold equivalent to an output power of -15 dBm, then a LED , labelled 'LASER FAIL', is turned ON, on the front panel and an opto-coupler is activated. Pin 10 emitter, pin 3 collector.

Video Fail. If video vertical block is not detected then the 'VIDEO PRES' LED on the front panel is turned off and an opto-coupler is activated. Pin 12 emitter, pin 5 collector.

Other controls available from the alarm output:

Clamp Disable. On the alarm output, if pin 13 is connected to pin 1, the video clamp on the video input amplifier is disabled and the 'CLAMP' LED on the front panel is turned off.

The alarms available in the VA-392 are:

Receiver Loss. If the light received at the detector falls below a power level of approx. -26 dBm, the AGC can no longer correct for decreasing signal level. A LED, labelled 'RX LOSS' is turned ON, on the front panel and an opto-coupler is activated. Pin 10 is the emitter, pin 3 is the collector of the opto- coupler.

Video/Audio Mute. LK 3 and 4 are normally in place in the VA-392. When a receiver loss condition occurs, the video and audio signals are muted. A LED, labelled 'MUTE', is turned ON, on the front panel. The video signal is still available at the monitor output on the front panel under mute conditions.

Video Fail. If the video vertical block is not detected then the 'VIDEO PRES' LED on the front panel is turned off and the 'video fail' opto-coupler is activated. The video fail alarm at the alarm output is also activated by the video mute (receiver loss condition). Vertical block can still be detected for further decreasing signals under this condition. Therefore, the 'VIDEO PRES' indicator on the front panel will still indicate detection of the vertical block when 'RX LOSS' and 'MUTE' are on. However, the video fail alarm at the rear panel will be on because it is activated by both the loss of video block and the video mute (receiver loss) condition whichever occurs first. The 'Video Fail' alarm opto-coupler is at the alarm output pin 11 (emitter) and pin 4 (collector).

Other controls available from the alarm output:

Clamp Disable. On the alarm output, if pin 12 is connected to pin 1, the video clamp on the video input amplifier is disabled and the 'CLAMP' LED on the front panel is turned off.

Input / output controls and indicators

VA-391 (PL9 - D connector rear)

D15 rear connector

Pin		Pin	
1	Ground	9	WIDEBAND control (Ground for Wideband)
2	Ground	10	LASER FAIL Indication -
3	LASER FAIL Indication +	11	HI-PWR Indication -
4	HI-PWR Indication +	12	VIDEO FAIL Indication -
5	VIDEO FAIL Indication +	13	CLAMP Disable control (Ground for Clamp off)
6	N/C	14	N/C
7	N/C	15	N/C
8	N/C		

VA-392 (PL 3 - D connector rear)

D15 rear connector

Pin		Pin	
1	Ground	9	WIDEBAND control (Ground for Wideband)
2	N/C	10	RX LOSS Indication -
3	RX LOSS Indication +	11	VIDEO FAIL Indication -
4	VIDEO FAIL Indication +	12	CLAMP Disable control (Ground for Clamp off)
5	N/C	13	N/C
6	N/C	14	N/C
7	N/C	15	N/C
8	N/C		

Four channel audio:

Note: Telecom units are supplied with two audio channels fitted with subcarrier frequencies of 7.5 & 8.3 MHz and may not be fitted with additional audio channels without changing these original modules.

Units fitted with four audio channels use the following audio subcarrier frequencies i.e.

7.36 MHz
7.765 MHz
8.215 MHz
8.71 MHz

The audio configuration is as follows:

VA-391:
LK 8-11 IN

VA-392:
LK 9-12 IN

See section on link locations & functions for a complete listing of link positions

The video filter in these units is a low pass filter 803112.

Block diagrams reference 802365 sheets 5 & 6 show units with four audio channels.

AC / DC power selection

See diagrams 803265 -sheets 3 & 4.

The VA-391 and VA-392 may be powered from either 240 Vac or -48 Vdc. These options are included on all units, but are exclusive in use.

All units are shipped configured for 240 Vac operation unless otherwise specified. If any unit is changed to -48 Vdc operation it should be suitable identified on the rear panel next to the power input connectors.

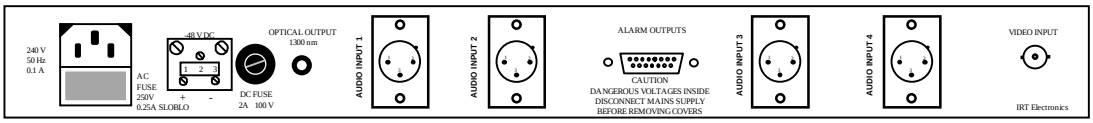
Changing the power source is accomplished by soldering an internal link to the appropriate position. These links are located on the main PCB next to the power inlet connector block. Link positions are indicated on the PCB overlay. The links may be changed by careful soldering without accessing the underside of the PCB.
Before changing link setting remove all power connections and allow at least 1 minute for power supply voltages to subside.

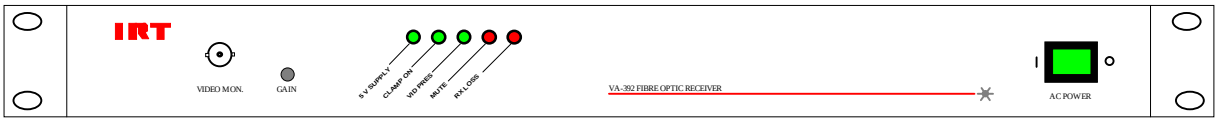
> Before re-connecting power ensure that only one link is in place i.e. the unit can accept **either AC or DC, but not both at once**.
>
> **Failure to observe this precaution may result in damage to the unit.**

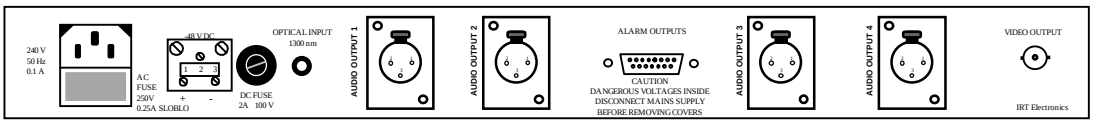
For -48 Vdc operation the correct input polarities are marked under the power inlet connector on the rear panel next to each wire entry point.

Front & rear panel connector diagrams

The following front panel and rear assembly drawings are not to scale and are intended to show relative positions of connectors, indicators and controls only.







Installation

Before commencing installation please read configuration section carefully and make any link changes required to suit the particular application.

See also section on operational adjustments.

Video connections:

Connection is made via BNC connectors on the rear panel of both the VA-391 & VA-392.

The VA-391 video input is of the loop through type and must be either terminated with a 75 Ω termination plug on one connector or looped to another piece of equipment which is terminated in 75 Ω.

The VA-392 video output must be connected to a 75 Ω terminated load for proper output level.

Audio connections:

Connection is made via XLR style connectors on the rear panel of both the VA-391 & VA-392. Care should be taken to observe the correct polarity.

Pin 1 Ground
Pin 2 +
Pin 3 -

Optical connections:

Connection is made via DIN 47256 connectors on the rear panel of both the VA-391 & VA-392.

Extreme cleanliness should be observed when making fibre optic connections. When not in use the fibre optic connector should be protected from dust ingress by fitting a cover such as the red plastic one provided with the unit when shipped.

When making the connection ensure that the lead connector is clean and is properly aligned before inserting gently into connector. Tighten retaining screw by hand only without exerting undue force.

Note that apart from distance the largest single cause of losses in a fibre optic path are at connectors and that poor or dirty connections can result in significant degradation in link performance or complete loss of signal.

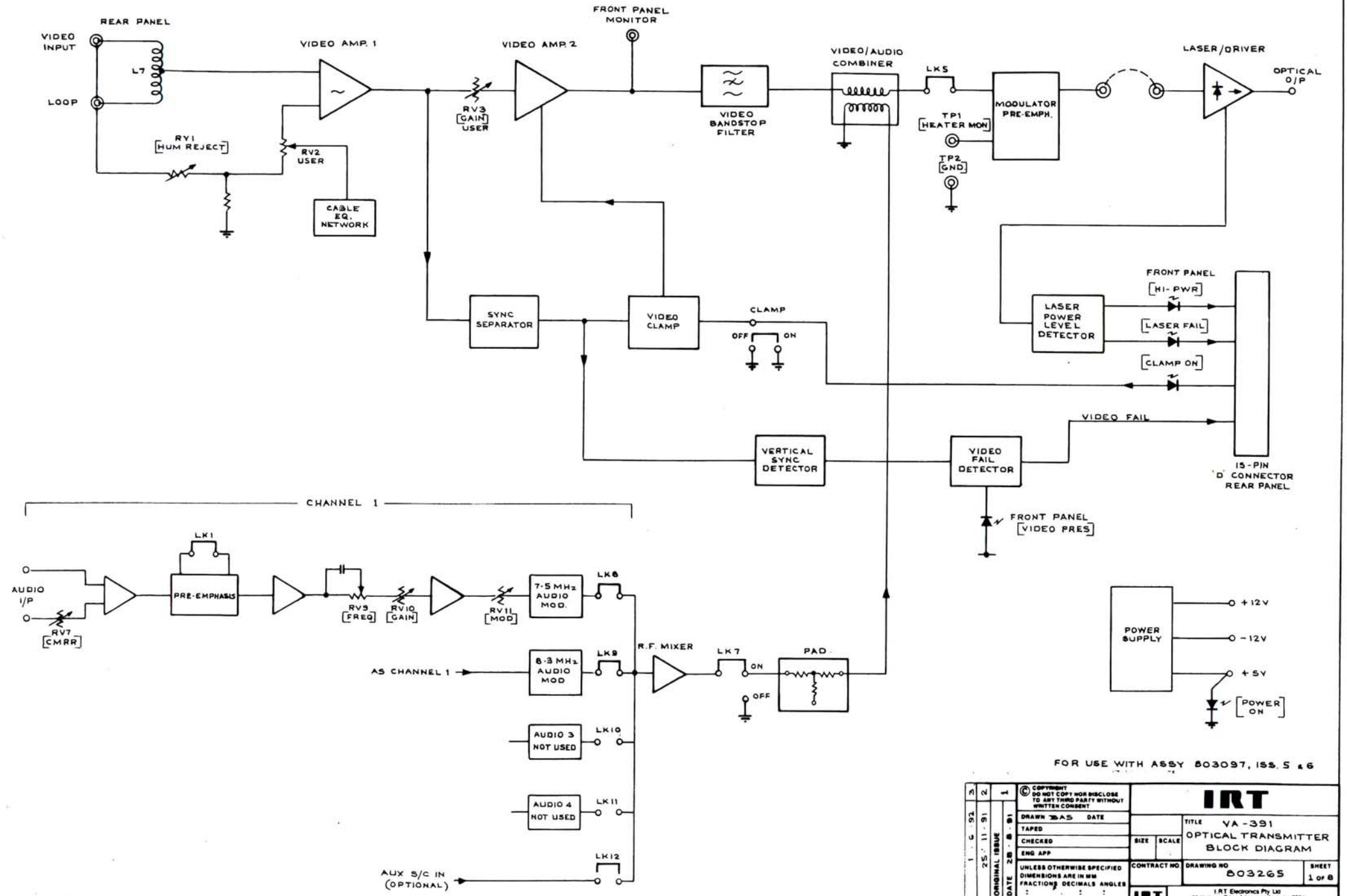
Alarm connections:

See alarm section for details.

Drawing list

Unless otherwise specified all references on diagrams refer equally to Telecom and standard units.

Drawing #	Sheet#	Description
803265	1	VA-391 transmitter block diagram.
803265	3	VA-391 diagram showing location of plugs, links and variable components
803265	5	VA-391 transmitter block diagram with 4 channel audio
803265	7	VA-391 optical transmitter block diagram showing wideband switching
803097	8	VA-391 transmitter connector listing
803097	9	VA-391 component layout
803265	2	VA-392 receiver block diagram
803265	4	VA-392 receiver diagram showing location of plugs, links and variable components
803265	6	VA-392 receiver block diagram with 4 channel audio
803265	8	VA-392 optical receiver block diagram showing wideband switching
803101	8	VA-392 receiver connector listing
803101	9	VA-392 component layout



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			ENG APP
1.6.92	25.11.91	ORIGINAL ISSUE DATE 28.8.91	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MM FRACTIONS DECIMALS ANGLES

IRT

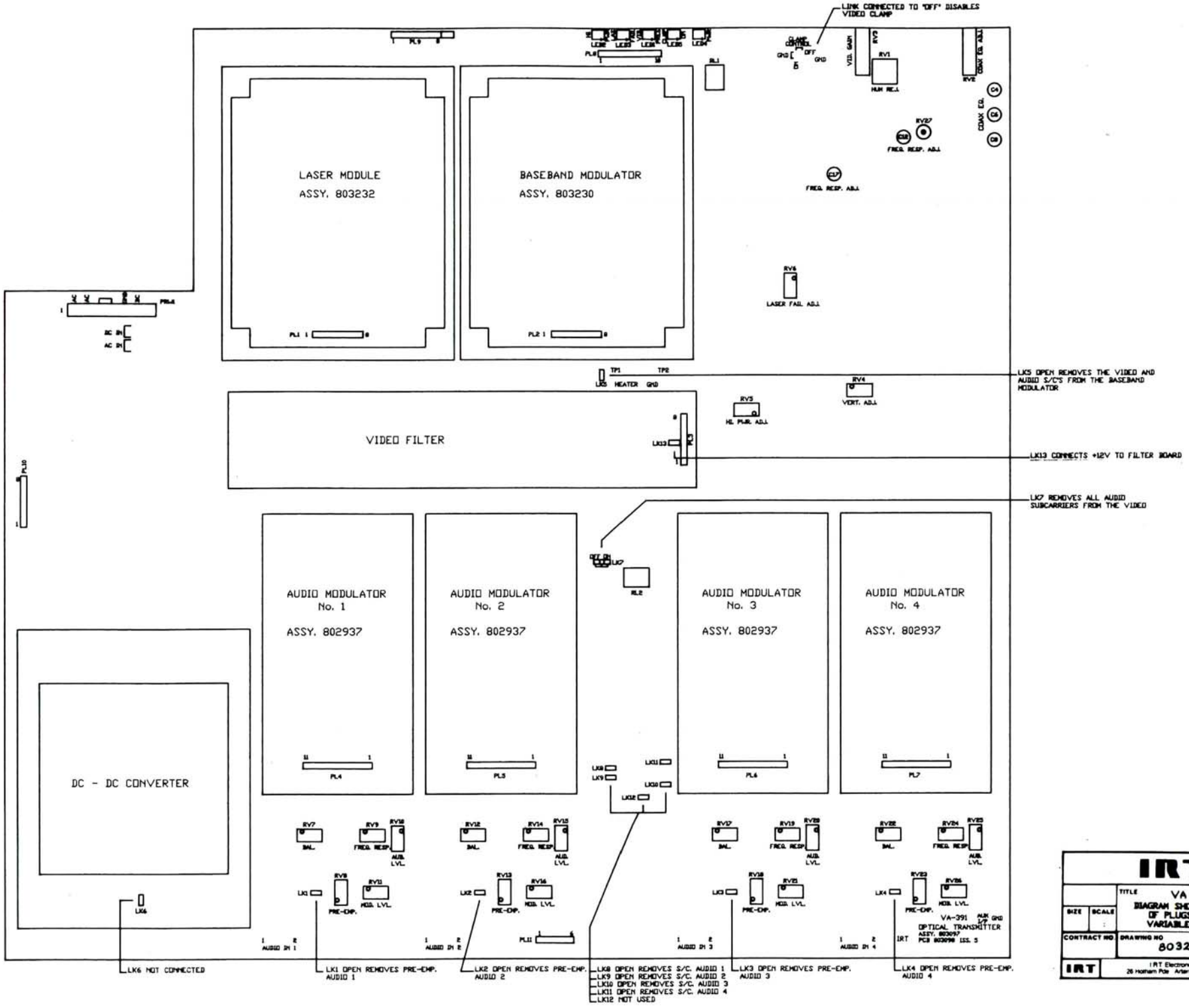
TITLE VA-391 OPTICAL TRANSMITTER BLOCK DIAGRAM

SIZE | SCALE

CONTRACT NO | DRAWING NO 803265 | SHEET 1 of 8

IRT

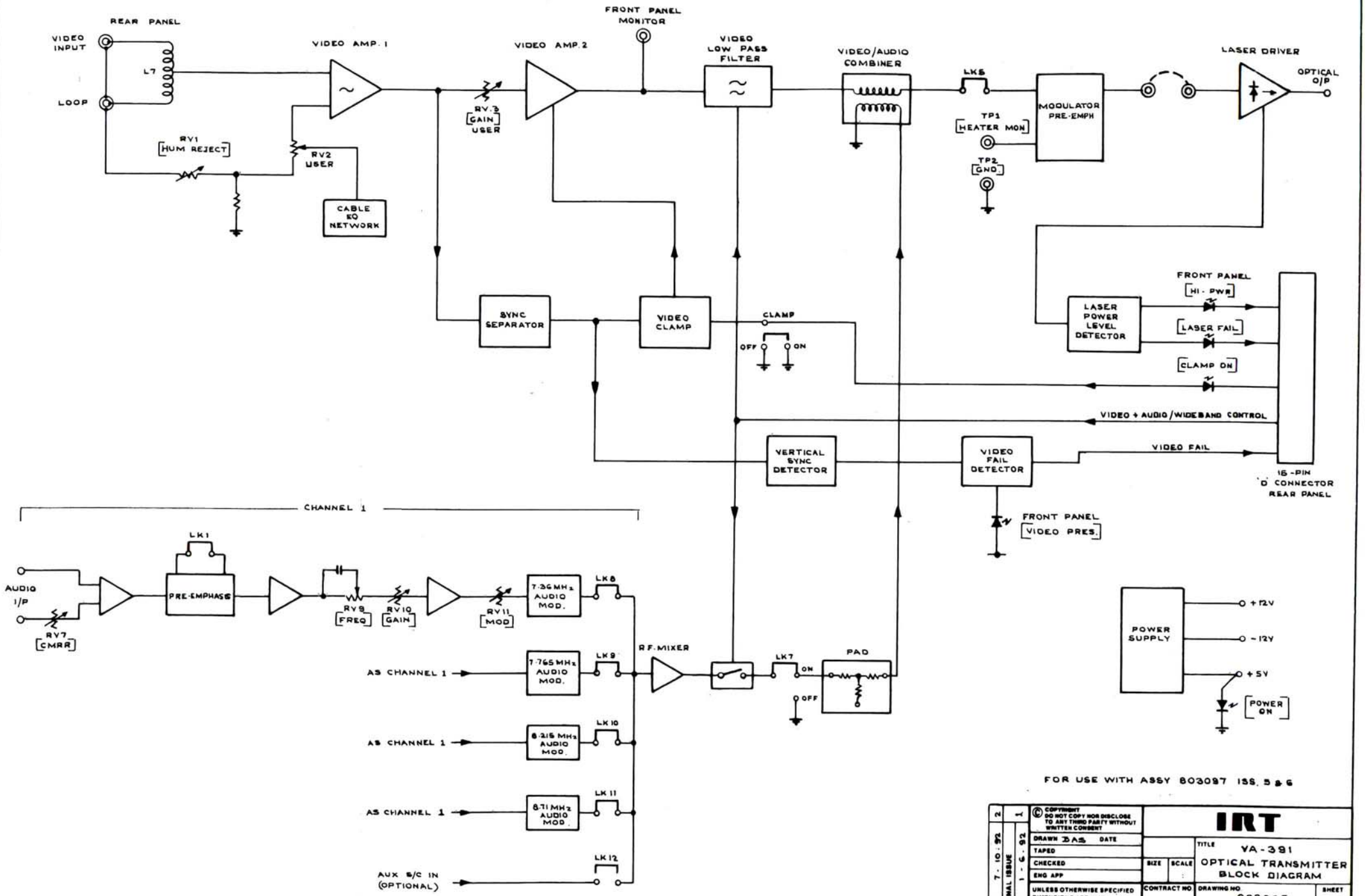
IRT Electronics Pty Ltd
26 Hotham Pde Artarmon Australia 2064



IRT

TITLE	VA - 391 DIAGRAM SHOWING LOCATION OF PLUGS, LINKS AND VARIABLE COMPONENTS
SIZE / SCALE	
CONTRACT NO	DRAWING NO 803265
SHEET	3 OF 8

IRT Electronics Pty Ltd
26 Hotham Pde Artarmon Australia 2064



FOR USE WITH ASSY 803097 ISS. 5 & 6

DRAWN	DAS	DATE	7-10-92
TRACED			
CHECKED			
ENG APP			

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MM FRACTIONS DECIMALS ANGLES : : :

ISSUE	DATE
1	1-6-92
2	7-10-92

ORIGINAL ISSUE

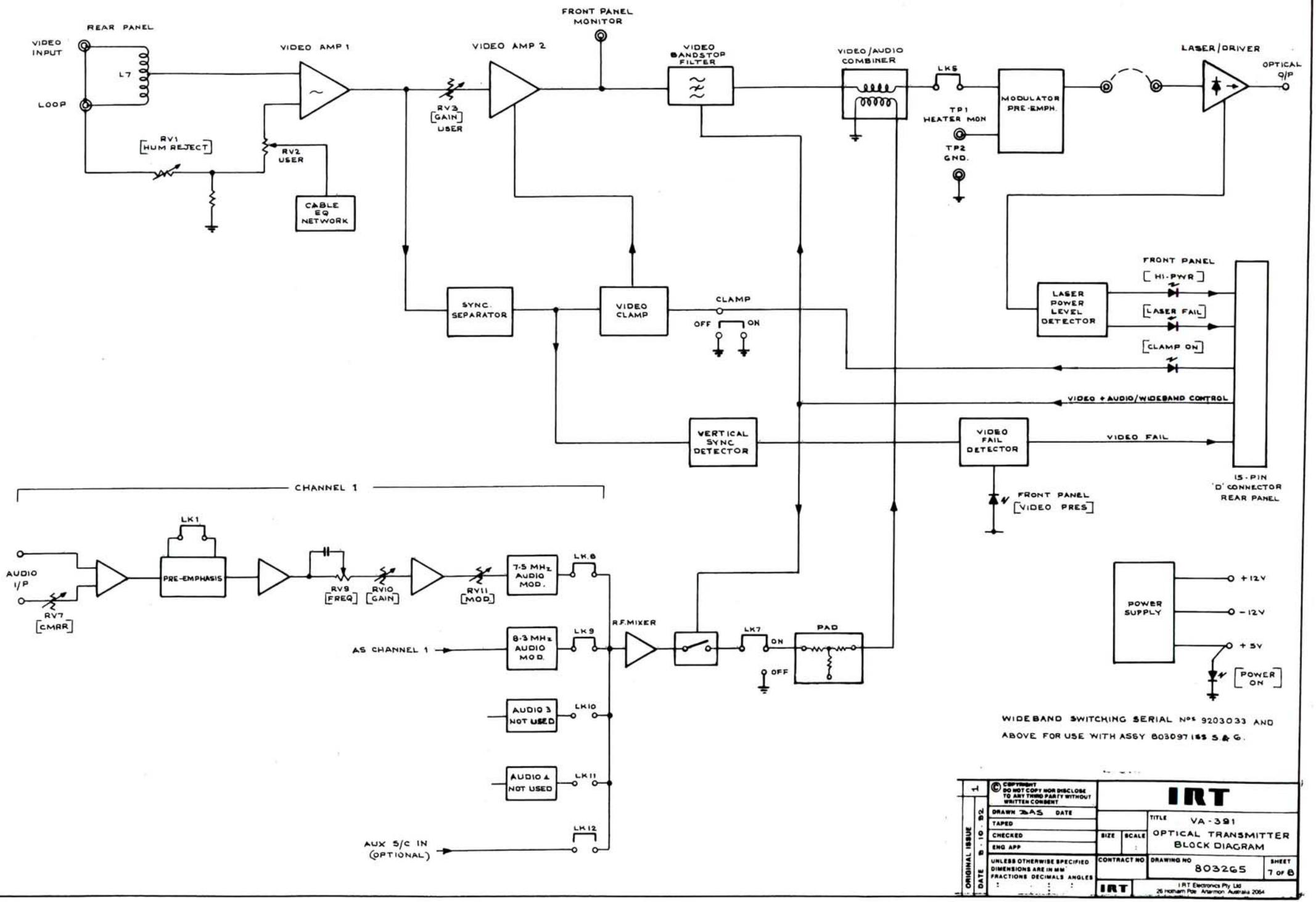
IRT

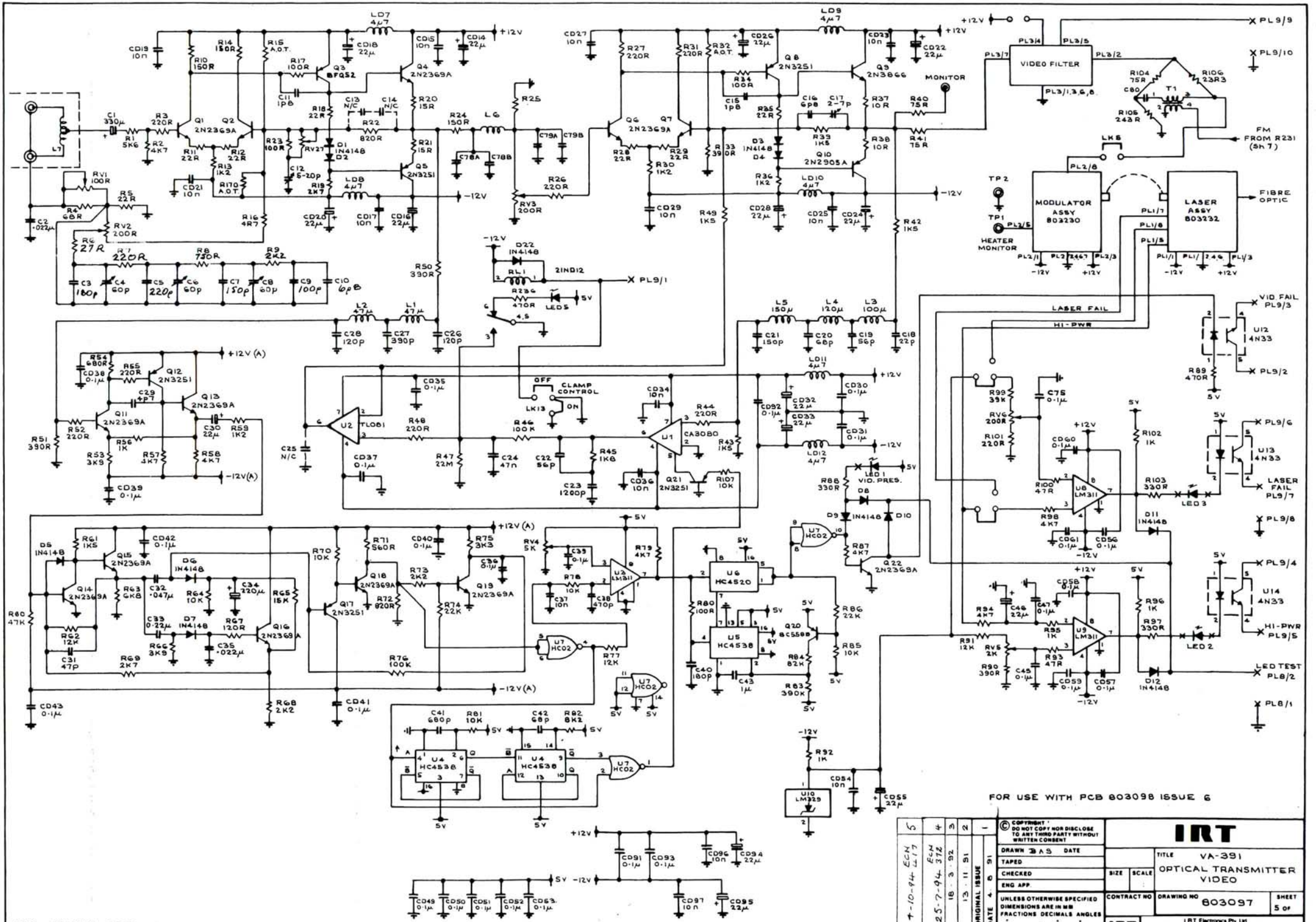
TITLE: VA-391 OPTICAL TRANSMITTER BLOCK DIAGRAM

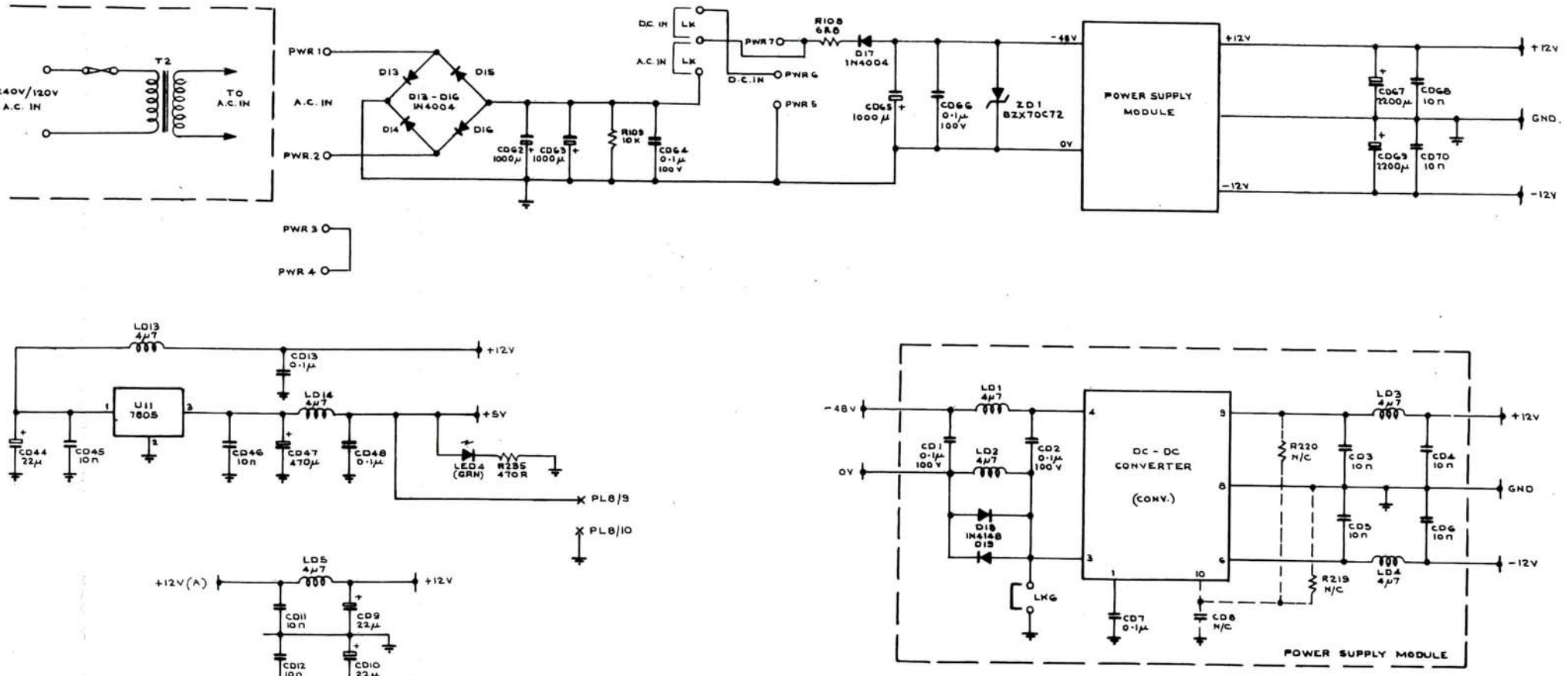
SIZE | SCALE :

CONTRACT NO | DRAWING NO 803265 | SHEET 5 OF 8

IRT Electronics Pty Ltd
26 Hotham Pde Artarmon Australia 2064

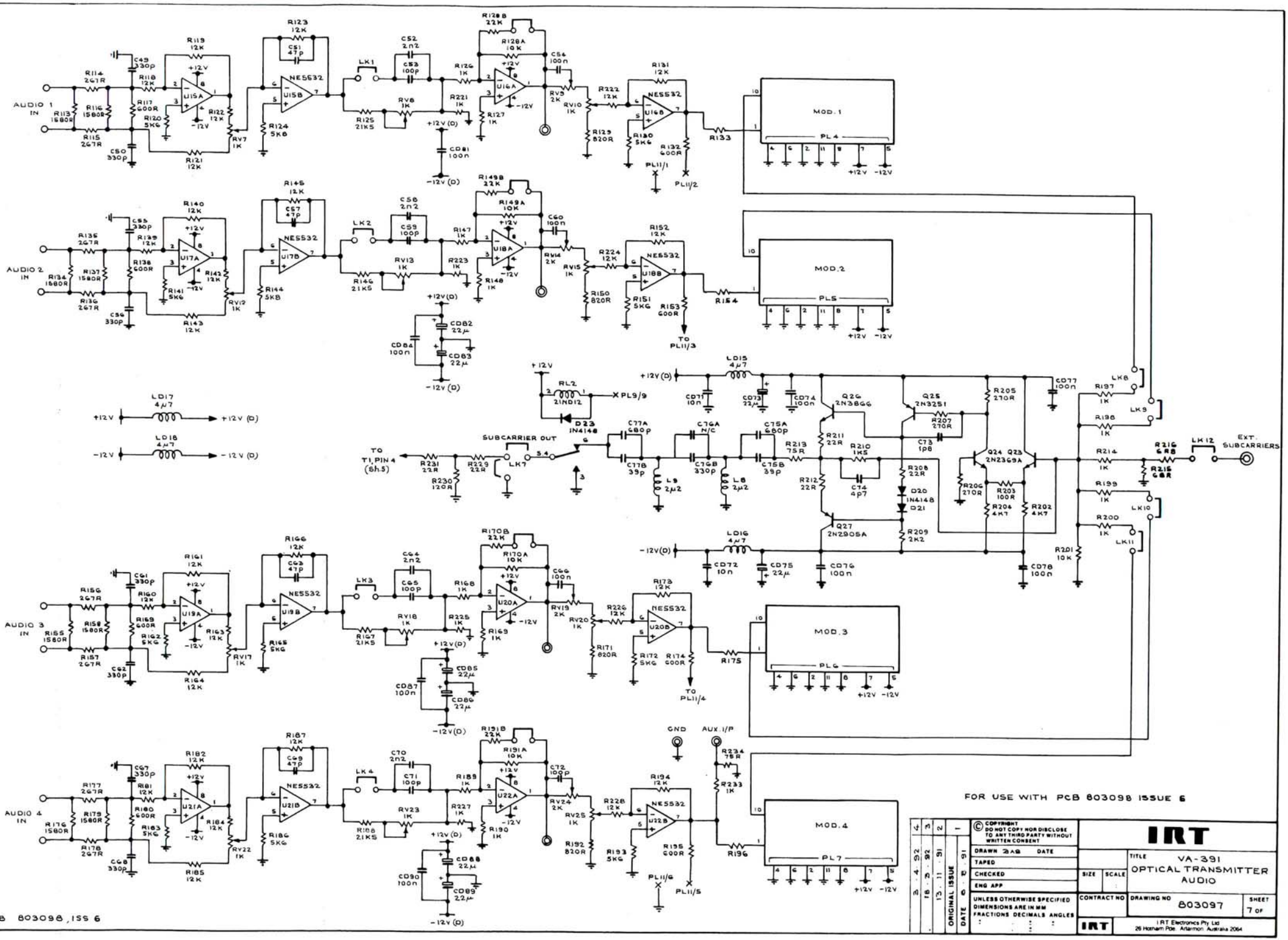

REAR PANEL
VIDEO INPUT
LOOP
L7
VIDEO AMP 1
RV1 HUM REJECT
RV2 USER
CABLE EQ NETWORK
RV3 GAIN USER
VIDEO AMP 2
FRONT PANEL MONITOR
VIDEO BANDSTOP FILTER
VIDEO/AUDIO COMBINER
LK5
TP1 HEATER MON
TP2 GND.
MODULATOR PRE-EMPH.
LASER/DRIVER
OPTICAL O/P
SYNC. SEPARATOR
VIDEO CLAMP
CLAMP
OFF
ON
FRONT PANEL
HI-PWR
LASER FAIL
CLAMP ON
LASER POWER LEVEL DETECTOR
VIDEO + AUDIO/WIDEBAND CONTROL
VERTICAL SYNC DETECTOR
VIDEO FAIL DETECTOR
VIDEO FAIL
15-PIN 'D' CONNECTOR REAR PANEL
FRONT PANEL
VIDEO PRES
CHANNEL 1
LK1
AUDIO I/P
RV7 CMRR
PRE-EMPHASIS
RV9 FREQ
RV10 GAIN
RV11 MOD.
7·5 MHz AUDIO MOD.
LK8
AS CHANNEL 1
8·3 MHz AUDIO MOD.
LK9
R.F. MIXER
LK7
ON
OFF
PAD
AUDIO 3 NOT USED
LK10
AUDIO 4 NOT USED
LK11
AUX S/C IN (OPTIONAL)
LK12
POWER SUPPLY
+12V
-12V
+5V
POWER ON
WIDEBAND SWITCHING SERIAL Nos 9203033 AND ABOVE FOR USE WITH ASSY 803097 ISS 5 & 6.
IRT
VA-391
OPTICAL TRANSMITTER BLOCK DIAGRAM
DRAWING NO 803265
SHEET 7 OF 8
ORIGINAL ISSUE DATE 8-10-92
IRT Electronics Pty Ltd 26 Hotham Pde Artarmon Australia 2064


VIDEO FILTER
MODULATOR ASSY 803230
LASER ASSY 803232
MONITOR
FM FROM R231 (Sh 7)
FIBRE OPTIC
HEATER MONITOR
CLAMP CONTROL
LASER FAIL
HI-PWR
VID FAIL PL9/3
LED TEST PL8/2
FOR USE WITH PCB 803098 ISSUE 6
PCB 803098, ISS. 6
IRT
VA-391
OPTICAL TRANSMITTER VIDEO
DRAWING NO 803097
SHEET 5 OF
IRT Electronics Pty Ltd
26 Hotham Pde Artarmon Australia 2064



FOR USE WITH PCB 803098 ISSUE 6

ORIGINAL ISSUE	2	-	© COPYRIGHT DO NOT COPY NOR DISCLOSE TO ANY THIRD PARTY WITHOUT WRITTEN CONSENT	IRT		
DATE	3·4·92		DRAWN BAS DATE		TITLE	VA-391 OPTICAL TRANSMITTER POWER SUPPLY
	4·6·91		TAPED		SIZE / SCALE	
			CHECKED		CONTRACT NO	DRAWING NO 803097
			ENG APP			SHEET 6 OF
			UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MM FRACTIONS DECIMALS ANGLES	IRT	IRT Electronics Pty Ltd 26 Hotham Pde Artarmon Australia 2064	



PCB 803098, ISS 6

4	3 - 4 - 92	ORIGINAL ISSUE	DATE	6 - 12 - 91
3	18 - 2 - 92			
2	13 - 11 - 91			
1	.			

DRAWN DAB DATE
TAPED
CHECKED
ENG APP

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

IRT

TITLE: VA-391 OPTICAL TRANSMITTER AUDIO

SIZE | SCALE

CONTRACT NO | DRAWING NO 803097 | SHEET 7 OF

IRT Electronics Pty Ltd
26 Hotham Pde Artarmon Australia 2064

1	X	-12V
2	X	GND
3	X	+12V
4	X	GND
5	X	HI-PWR INDICATOR
6	X	GND
7	X	LASER FAIL INDICATOR
8	X	LASER FAIL REFERENCE

PL1
MAIN P.C.B TO LASER ASSY.

1	X	AUDIO INPUT
2	X	GND
3	X	N/C
4	X	GND
5	X	-12V
6	X	GND
7	X	+12V
8	X	GND
9	X	N/C
10	X	SUB-CARRIER OUT
11	X	GND

PL4 - PL7
MAIN PCB TO AUDIO MODULATORS

1	X	CLAMP OFF (RL1) - CONNECT TO GND
2	X	VIDEO FAIL (U12/5)
3	X	VIDEO FAIL (U12/4)
4	X	HI-PWR (U14/5)
5	X	HI-PWR (U14/4)
6	X	LASER FAIL (U13/5)
7	X	LASER FAIL (U13/4)
8	X	GND.
9	X	WIDEBAND (GND TO ACTIVATE)
10	X	GND

PL9
REAR PANEL ALARMS.

1	X	-12V
2	X	GND
3	X	+12V
4	X	GND
5	X	HEATER MONITOR
6	X	GND
7	X	GND
8	X	BASEBAND INPUT

PL2
MAIN P.C.B TO BASEBAND MODULATOR

1	X	A.C IN
2	X	A.C IN
3	X	
4	X	
5	X	D.C. GND
6	X	D.C IN
7	X	D.C. IN

PWR.1
POWER

1	X	GND
2	X	SIGNAL OUT
3	X	GND
4	X	+12V
5	X	CONTROL PL9/9
6	X	GND
7	X	SIGNAL IN
8	X	GND

PL3
VIDEO FILTER OR PAD

1	X	GND
2	X	LED TEST
3	X	LED 2 (+ve) HI-PWR
4	X	LED 2 (-ve)
5	X	LED 3 (+ve) LASER FAIL
6	X	LED 3 (-ve)
7	X	N/C
8	X	LED 1 (-ve) VID. PRES.
9	X	5V
10	X	GND

PL8
FRONT PANEL INDICATORS

1	X	GND
2	X	CH.1 (600R)
3	X	CH 2 (600R)
4	X	CH. 3 (600R)
5	X	CH. 4 (600 R)
6	X	GND

PL11
AUDIO MONITORS

FOR USE WITH PCB 803098 ISS. 6

ORIGINAL ISSUE	4.9.91	1
	13.4.92	2

DRAWN DAS DATE
TAPED
CHECKED
ENG APP

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MM. FRACTIONS DECIMALS ANGLES

IRT

TITLE VA-391 OPTICAL TRANSMITTER CONNECTOR LISTING

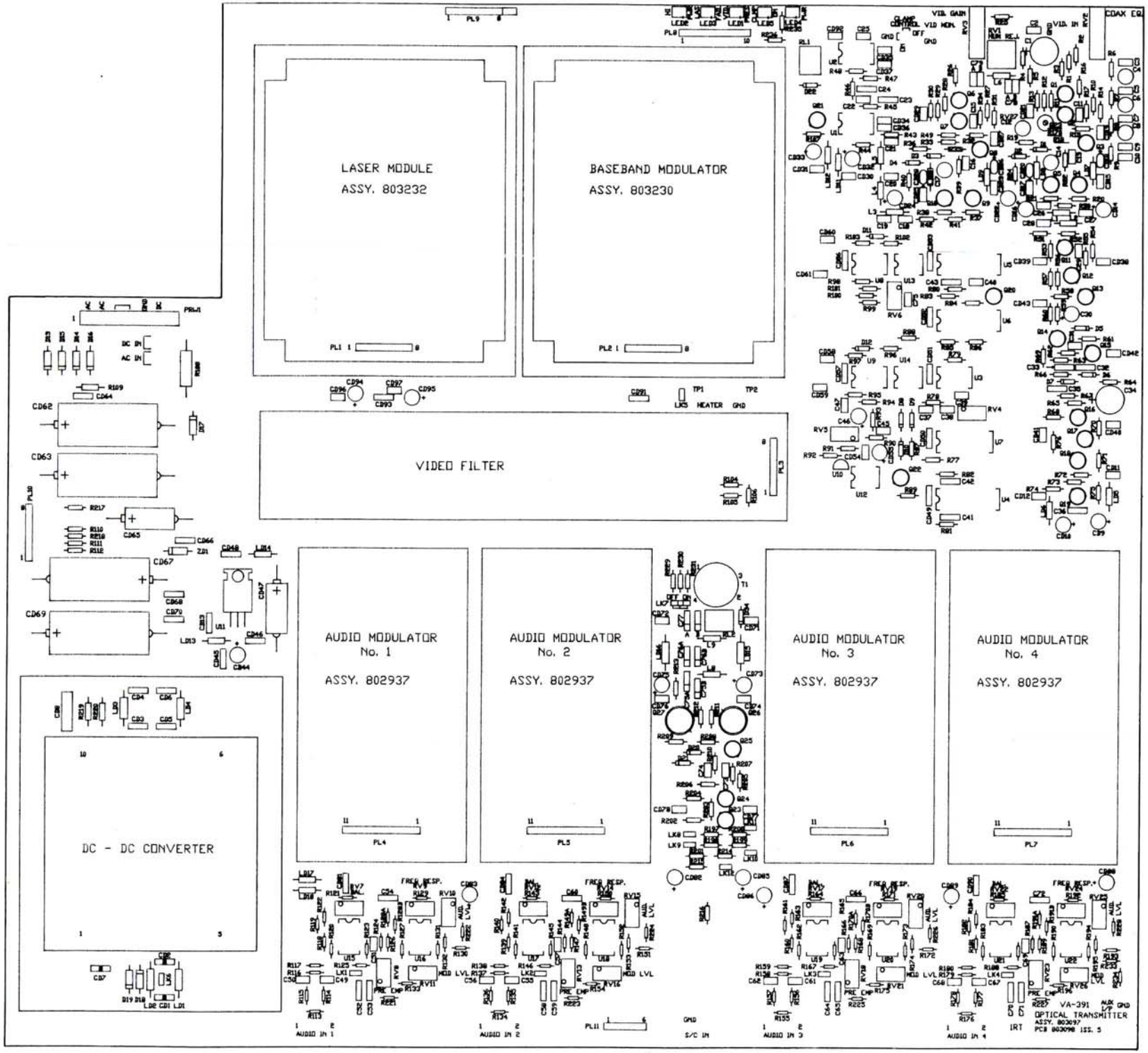
SIZE SCALE

CONTRACT NO

DRAWING NO 803097

SHEET 8 OF

IRT Electronics Pty Ltd
26 Holtham Rde Artarmon Australia 2064



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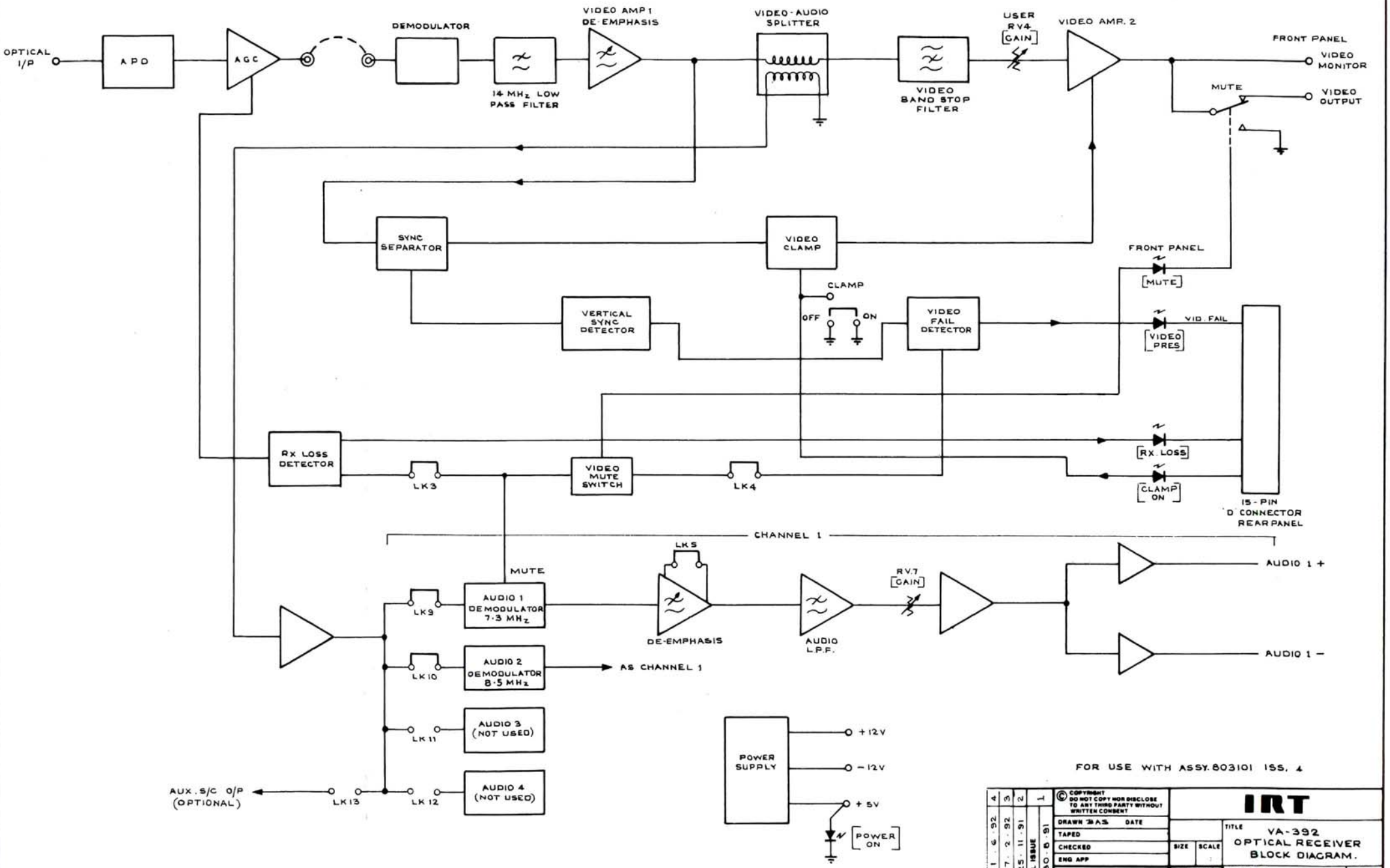
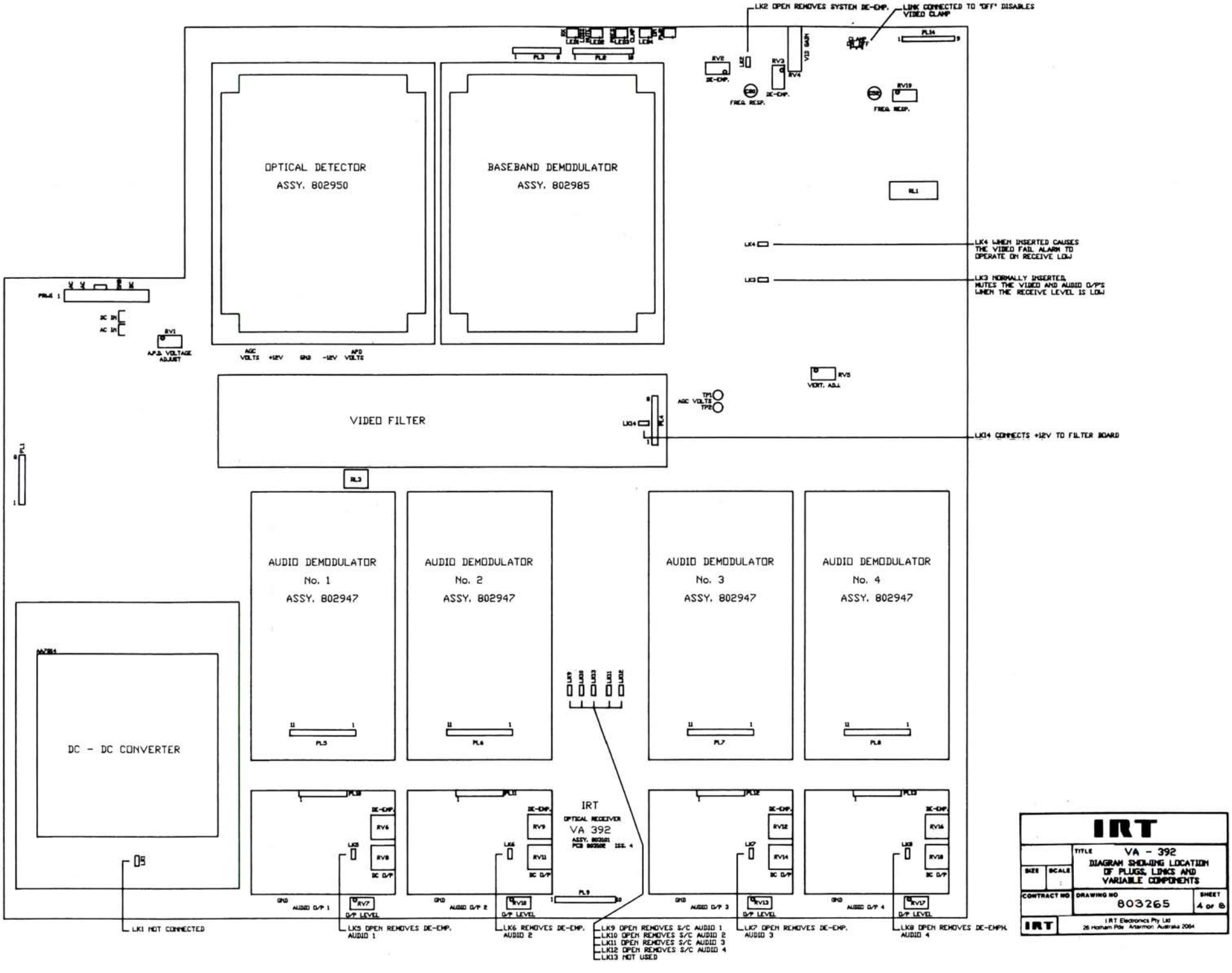
SIZE	SCALE	TITLE: VA-391 COMPONENT LAYOUT
CONTRACT NO	DRAWING NO: 803097	SHEET: 9 OF
	IRT Electronics Pty. Ltd.	

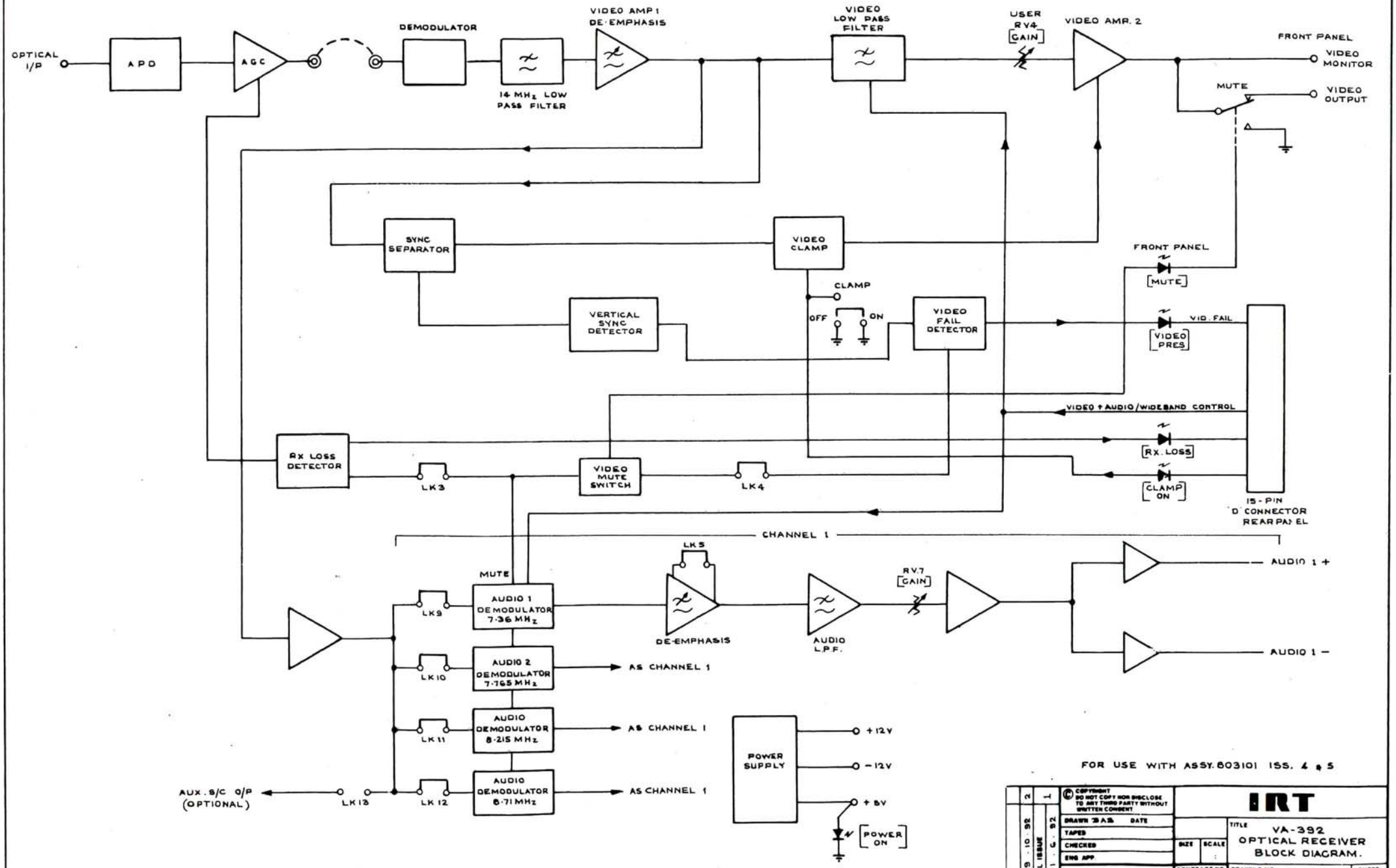


FOR USE WITH ASSY. 803101 ISS. 4

4	16·6·92	ORIGINAL ISSUE	30·8·91	1	© COPYRIGHT DO NOT COPY NOR DISCLOSE TO ANY THIRD PARTY WITHOUT WRITTEN CONSENT	IRT
3	7·2·92				DRAWN BAS DATE	TITLE VA-392 OPTICAL RECEIVER BLOCK DIAGRAM.
2	25·11·91				TAPED	SIZE / SCALE
					CHECKED	
					ENG APP	
					UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MM FRACTIONS DECIMALS ANGLES	CONTRACT NO / DRAWING NO 803265 / SHEET 2 OF 8
					IRT	IRT Electronics Pty Ltd 26 Hotham Pde Artarmon Australia 2064



IRT		
SIZE / SCALE	TITLE: VA - 392 DIAGRAM SHOWING LOCATION OF PLUGS, LINKS AND VARIABLE COMPONENTS	
CONTRACT NO	DRAWING NO: 803265	SHEET: 4 of 8
IRT	IRT Electronics Pty Ltd, 26 Hotham Pde Artarmon Australia 2064	

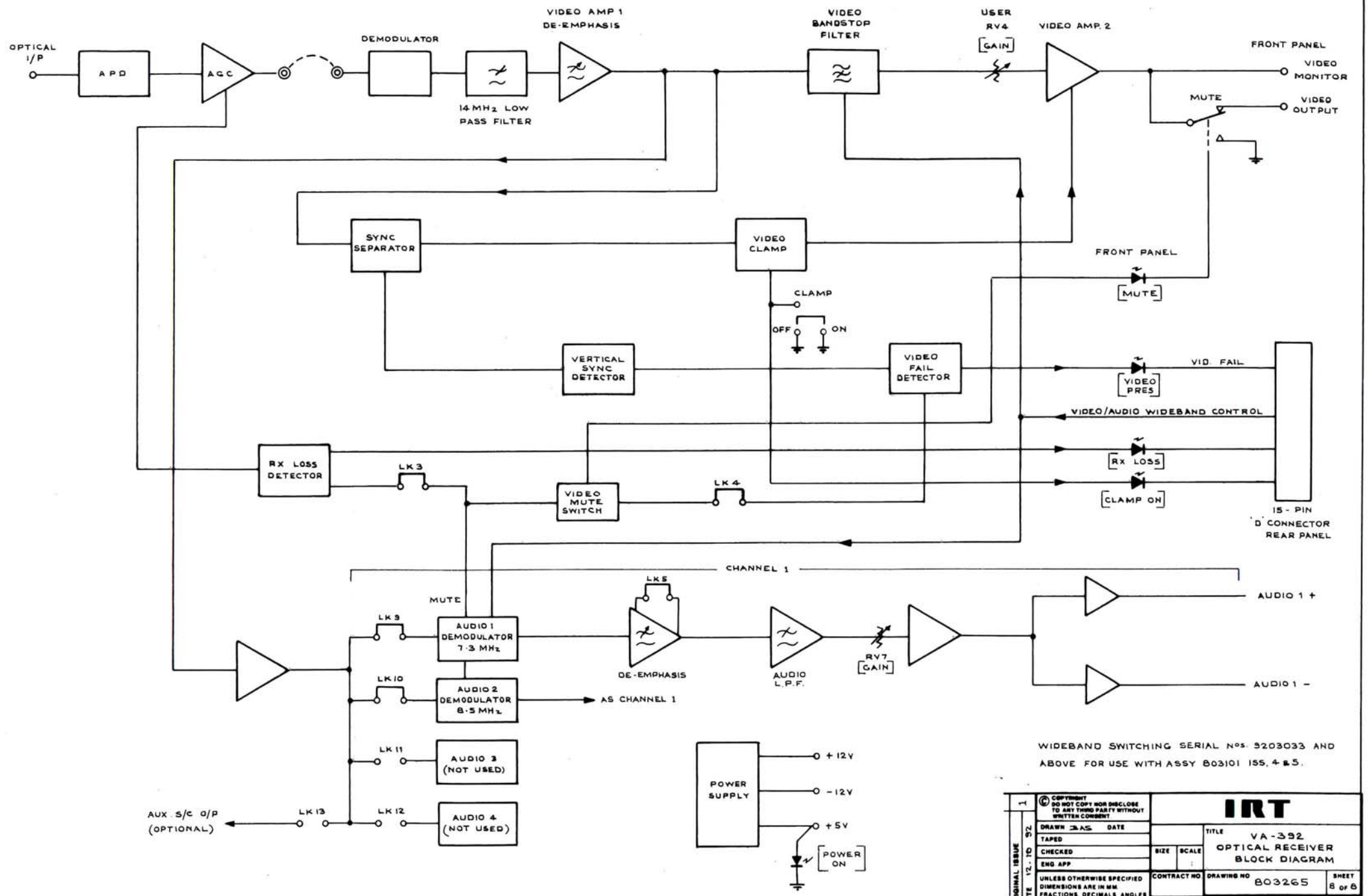


FOR USE WITH ASSY. 803101 ISS. 4 & 5

2	9-10-92			IRT	
1	ORIGINAL ISSUE	DATE 1-6-92	DRAWN BAS DATE	TITLE VA-392 OPTICAL RECEIVER BLOCK DIAGRAM.	
			TAPED	SIZE	SCALE
			CHECKED	CONTRACT NO	DRAWING NO 803265
			ENG APP.		SHEET 6 OF 8

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MM FRACTIONS DECIMALS ANGLES

IRT Electronics Pty Ltd
26 Hotham Pde Artarmon Australia 2064



WIDEBAND SWITCHING SERIAL Nos. 9203033 AND ABOVE FOR USE WITH ASSY 803101 1S5, 4 & 5.

ORIGINAL ISSUE 1
DATE 12. 10. 92
DRAWN BAS DATE
TAPED
CHECKED
ENG APP
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MM. FRACTIONS DECIMALS ANGLES

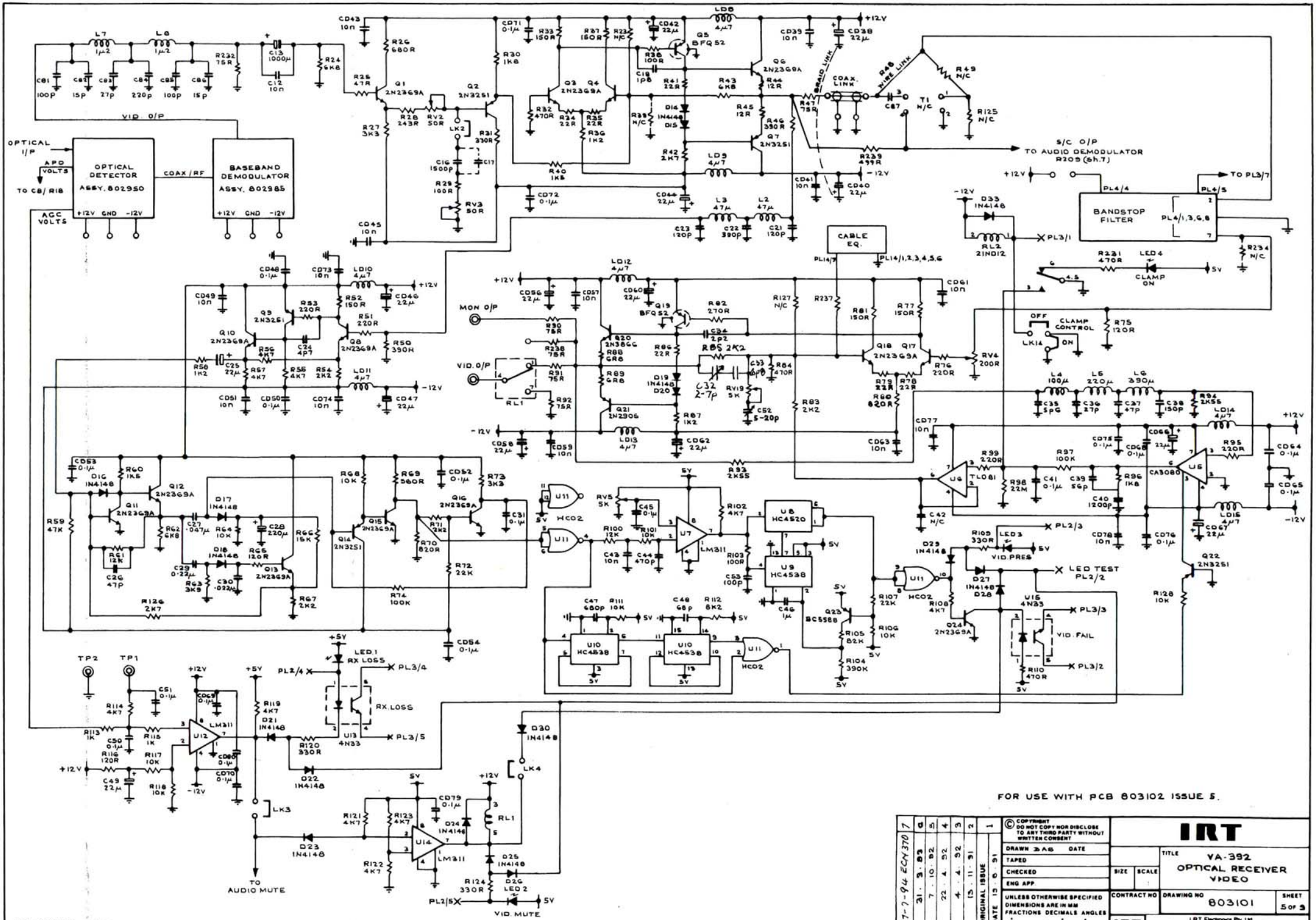
IRT

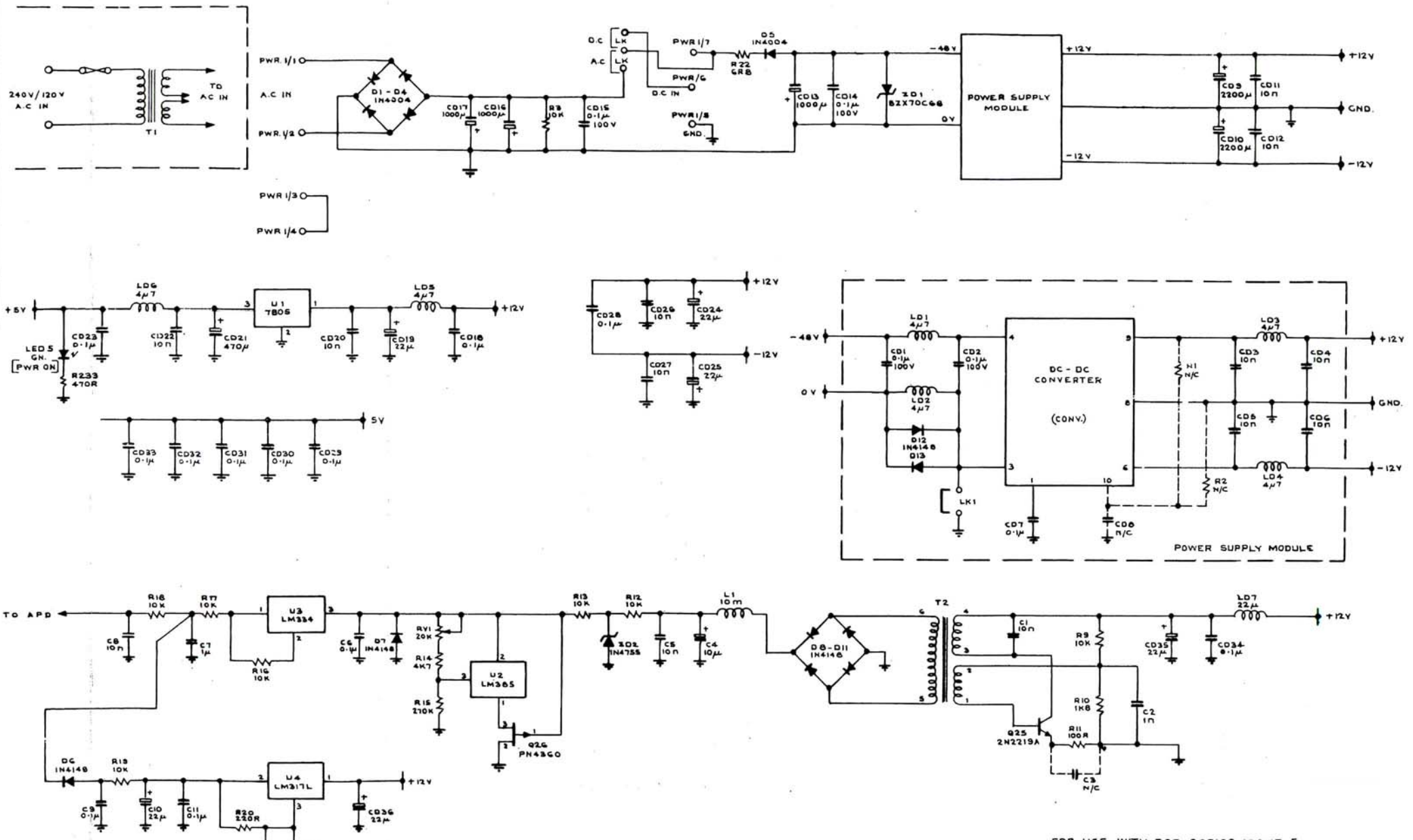
TITLE VA-392 OPTICAL RECEIVER BLOCK DIAGRAM

SIZE | SCALE

CONTRACT NO | DRAWING NO 803265 | SHEET 8 OF 8

IRT Electronics Pty Ltd
26 Hotham Pde Artarmon Australia 2064


OPTICAL I/P
APD VOLTS
TO CB/R18
AGC VOLTS
OPTICAL DETECTOR ASSY. 802950
BASEBAND DEMODULATOR ASSY. 802985
COAX/RF
VID O/P
+12V GND -12V
+12V GND -12V
COAX. LINK
S/C O/P TO AUDIO DEMODULATOR R205 (sh.7)
CABLE EQ.
BANDSTOP FILTER
TO PL3/7
CLAMP ON
CLAMP CONTROL
OFF
ON
MON O/P
VID. O/P
RL1
HCO2
LM311
TL081
CA3080
HC4520
HC4538
BC558B
4N33
VID. PRES
LED TEST PL2/2
VID. FAIL
RX LOSS
VID. MUTE
TO AUDIO MUTE
FOR USE WITH PCB 803102 ISSUE 5.
PCB 803102 ISS 5
IRT
VA-392
OPTICAL RECEIVER VIDEO
DRAWING NO 803101
SHEET 5 of 9
IRT Electronics Pty Ltd
26 Hotham Pde Artarmon. Australia 2064
ORIGINAL ISSUE
DRAWN JAS DATE
TAPED
CHECKED
ENG APP
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MM FRACTIONS DECIMALS ANGLES
27-7-94 ECN 370



FOR USE WITH PCB 803102 ISSUE 5

DRAWN	BAS	DATE	3-4-92
TAPED			
CHECKED			
ENG. APP.			

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

ORIGINAL ISSUE DATE 23-6-91

IRT

TITLE VA-392 OPTICAL RECEIVER POWER SUPPLY

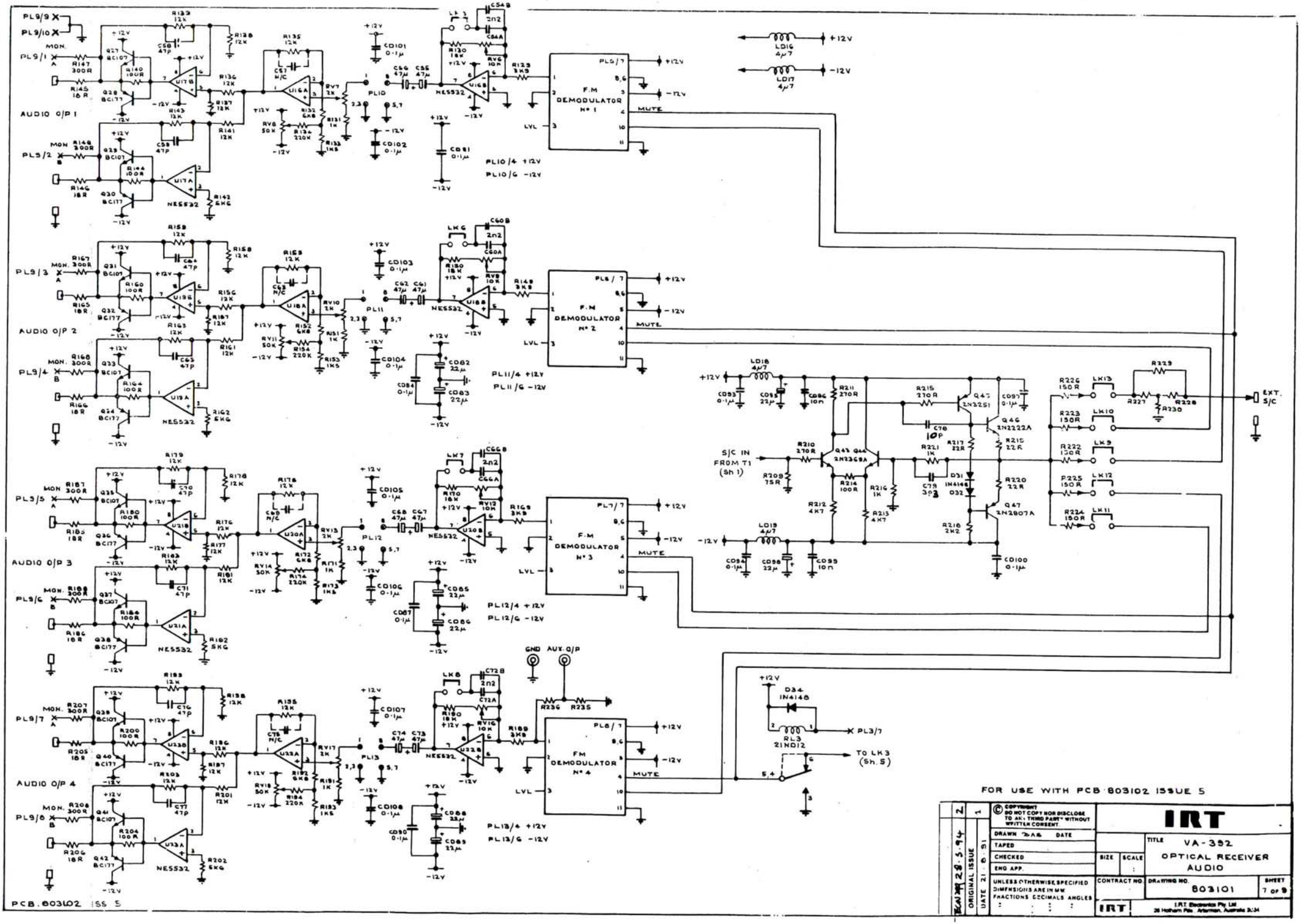
SIZE | SCALE :

CONTRACT NO | DRAWING NO. 803101 | SHEET 6 OF 9

IRT

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

PCB 803102 ISS 5



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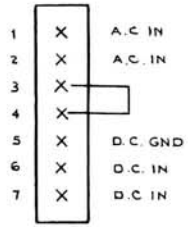
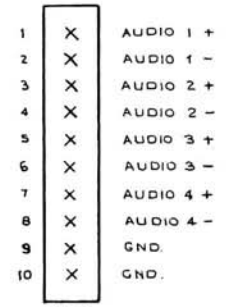
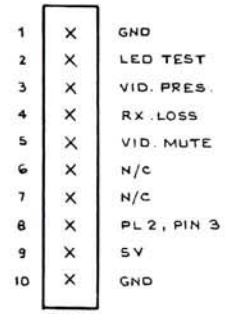
1		DRAWN DAS DATE	TITLE	VA-392 OPTICAL RECEIVER AUDIO	
EAW 28.5.94		TAPED	SIZE	SCALE	
ORIGINAL ISSUE		CHECKED			
DATE 21.6.91		ENG APP.	CONTRACT NO.	DRAWING NO. 803101	SHEET 7 of 9
		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MM FRACTIONS DECIMALS ANGLES	IRT	I.R.T. Electronics Pty Ltd 26 Hotham Pde. Artarmon, Australia 2064	



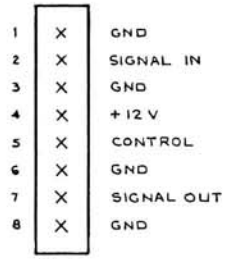
PWR.1
POWER



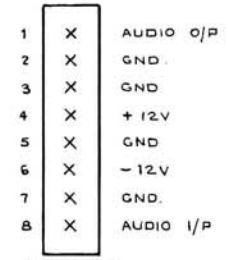
PL 9
AUDIO MONITOR



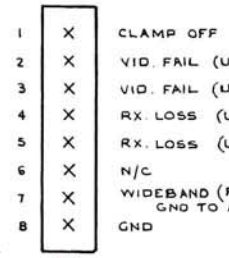
PL2
FRONT PANEL INDICATORS



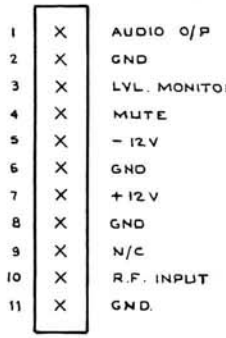
PL4
VIDEO FILTER OR PAD



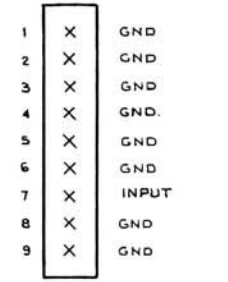
PL10 - PL13
AUDIO FILTER



PL3
REAR ALARM PANEL



PL5 - PL8
MAIN PCB TO AUDIO DEMODULATORS



PL.14
CABLE EQUALISER
(OPTIONAL)

FOR USE WITH PCB 803102, ISSUE 5

ORIGINAL ISSUE	1
DATE	4.9.91
2	
13.4.92	

DRAWN BAS DATE
TAPED
CHECKED
ENG APP

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MM
FRACTIONS DECIMALS ANGLES

IRT

TITLE VA-392
OPTICAL RECEIVER
CONNECTOR LISTING

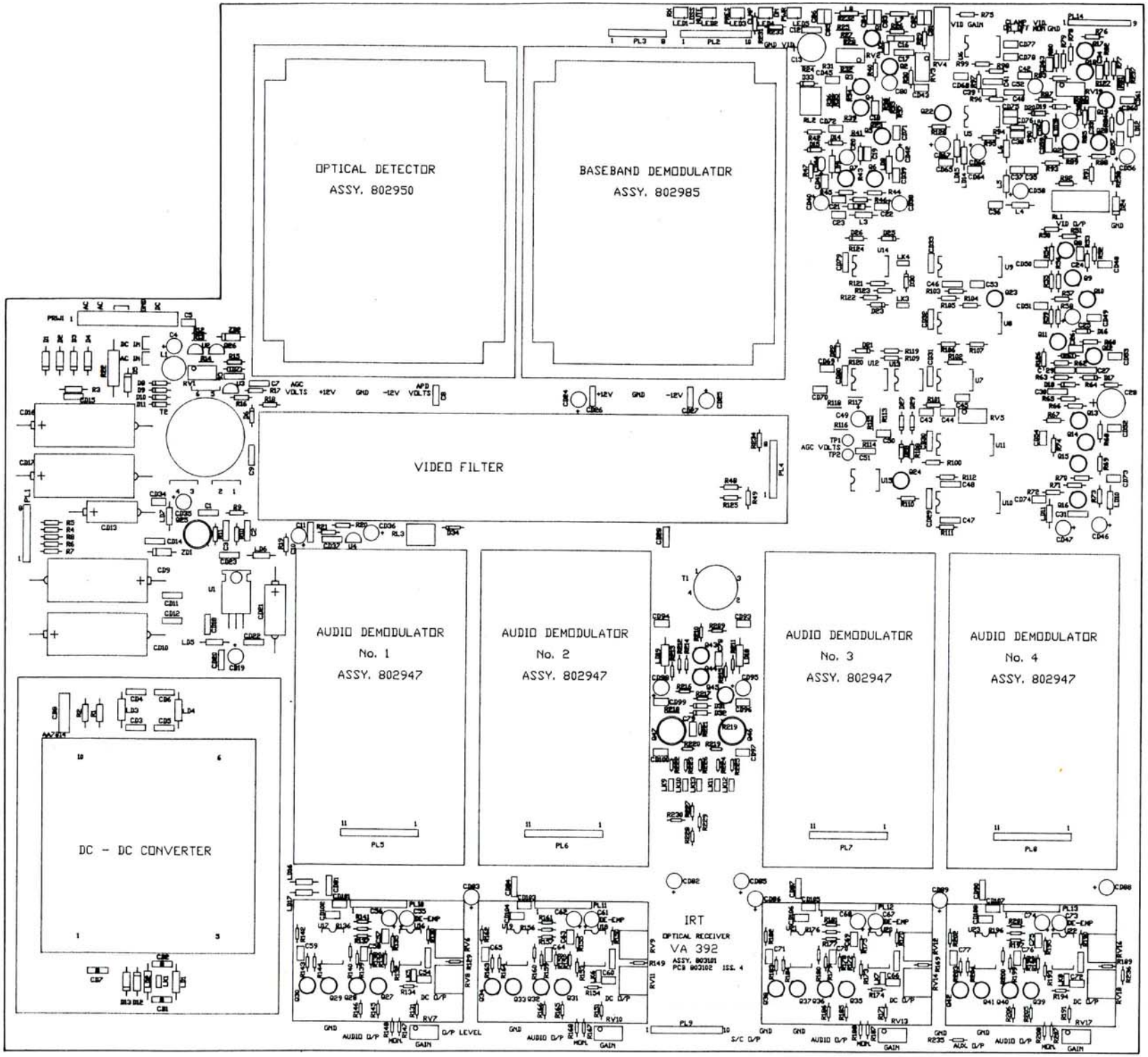
SIZE SCALE

CONTRACT NO

DRAWING NO 803101

SHEET 8 OF 9

IRT Electronics Pty Ltd
26 Hotham Pde Artarmon Australia 2064



IRT		
SIZE	SCALE	TITLE: VA-392 COMPONENT LAYOUT.
CONTRACT NO	DRAWING NO: 803101	SHEET: 3 of 3
IRT	IRT Electronics Pty Ltd, 26 Horham Pde, Artarmon, Australia 2064	