



Tait Electronics (Aust) Pty Ltd

A800V

Sinad Voter

(AM800V)

Issue D

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SECTION 1 INTRODUCTION

The A800V unit was designed to interface the established Doug Hall Electronics Sinad voter circuit board, type 4RV/2, to Tait T800 series of Base Station equipment.

The Voter PCB type 4RV/2 is housed in a 1RU 19 inch assembly together with a 600ohm balanced audio line to interface transmitters and receivers. A separate port is provided to permit priority access to the network if required.

Each voter assembly can control up to four base receivers (4 channels) but can be expanded to a maximum of 32 channels simply by adding additional A800V units. Each unit is fitted with an expansion port for this purpose.

Power supply requirement is 13.8 VDC negative earth supply.

An outline of Sinad voting techniques is at Annex A to this document. If the reader is not familiar with Sinad Base Station voting it should be read and understood prior to installation or servicing of the A800V unit.

Radio networks using a Tait Sinad voter, with base stations configured in a star network, have the repeat function implemented by the voter located at the network hub. Failure of the voter, or an interconnecting link, would result in a major system failure. To minimise the impact of such a failure, a module known as A800-TD (Talk-through Default module) is fitted to each repeater which causes the repeater to revert to "local repeat" in the event of a voter or link failure. Details of the A800-TD module are in Annex B to this document.

SECTION 2 SPECIFICATIONSA800V

Supply voltage	10.8 - 16V DC	
Supply Current	70 mA Standby - 250 mA Maximum	
Mounting	1 RU x 19" Rack Frame	
Audio Input	-20dBm to + 10 dBm	Nominal -10dBm
Audio Input Impedance	600 ohms	
Audio Output	- 30 dBm to + 6 dBm	Nominal -10dBm
Audio Output Impedance	600 ohms	
Frequency Response	300 Hz - 3000 Hz	
Receive Gate Input	Active Low (0 Volts)	
PTT Output	Active Low (0 Volts)	
Channel In/Out	Each channel has a 9 way D Range socket with balanced TX/RX Audio at 600 ohms, RX Gate & PTT reference to Earth	
Priority Port In/Out	9 way D Range socket with Balanced TX/RX Audio at 600 ohms, RX Gate & PTT reference to Earth	
Voting Method	Signal \ Noise	
Capacity	4 Channels	Expansion to 32 in blocks of 4
Dims	W- 483mm x H- 44mm x D- 337mm (19" rack mounting)	
Weight	0.34 kg	
Operating Temp	- 10 C to +60 C	
Fuse	Internal 0.75 Amp Polyswitch. Resttable circuit protector. Not a fuse.	

SECTION 3 TECHNICAL DESCRIPTION

3.1 OVERVIEW

The Tait A800V unit is made up of 3 Circuit boards mounted in a 1 RU 19” container. A 4 channel voter can control up to 4 receivers, although expansion up to 32 receivers is possible.

Circuit boards fitted to the Tait A800-Vote unit are:

- a. Voter PCB 4 channel - Doug Hall type 4RV-2
- b. Audio Interface PCB - Tait A800-VOTE
- c. Front panel PCB - Tait A800VTFP
- d. Header PCB - Tait 4RV

3.2 DETAILED DESCRIPTION

Receive Path

Receivers are interfaced to the voter through 9 way D range sockets fitted to the rear of the unit. The receive audio is routed from pins 1 and 2 of the D range connectors to the Audio PCB where the audio is converted from 600 ohm balanced to 600 ohm unbalanced, after which it is presented to the Voter PCB.

Receive gate functions are passed from pin 3 of the D range, through the Audio PCB and presented to the Voter. The receive gate function for a channel must be Active Low (zero volts) before audio from that channel is offered for assessment by the voter.

Voter Module

The Voter 4RV2 module contains 4 identical channels for Sinad evaluation. The module also contains calibration circuitry for alignment during installation. A channel is considered to be active when its corresponding RX gate (COR in) line is low. Audio from each active channel is passed via a multiturn input level adjustment and gain buffers. The voter selects one of the receiver audio channels, based upon the voter SINAD analysis, and this is buffered and passed to the Audio Interface PCB.

An active channel is indicated by a red LED while the voted channel shows a green LED.

Voting takes place at very fast rates, even on each speech syllable. Change-over between voted receivers is transparent and will continue as long as the receive gate functions are active.

A Vote Lock option is available which will lock on to a voted channel after a pre-set period and remain on that channel until the RX Gate function goes “high”. The pre-set lead-in delay is approximately 1 second. This permits continuous voting for the lead-in period, after which the voter locks onto the best signal for the duration of the transmission. This feature would normally be used on data systems where switching between receivers during data transmission could cause data errors. The data system lead-in delay (period from system key-up to start of data transmission) should be set longer than the “vote-lock” lead-in period to allow the voting network to settle.

Voted Audio Transmit Path

The selected audio signal (voted audio) is presented to the audio PCB for line amplification and impedance matching. Voted transmit audio is presented for transmission as balanced 600 ohm audio via pins 4 and 5 of the 9 way D range connectors on the rear of the unit.

The transmit PTT function originates in the Voter PCB and is mediated by the Audio PCB and presented to pin 6 of the D range connectors.

Priority Access Port

A Priority Access Port is provided via a 9 way D range socket on the rear of the unit. This facility is intended for connecting a Dispatcher or Operations Controller to the radio system who may require emergency over-ride of the voting system for operational reasons.

Voted audio and PTT function is presented to the priority port whenever the system is active. The priority port may be connected to a dedicated link, a landline or microwave system. In the reverse direction an active receive gate will initiate network PTT, remove normal voted audio and connect audio from the priority port to the system for transmission.

Expansion Port

This port is a 15 way D range connector fitted to the rear of the unit. It is used to link additional A800V units to increase the channel capacity. Expansion ports of voters are linked together via a common ribbon cable, which carries all necessary signals.

Refer to Section 4 for information on linking voters via the Expansion port.

Monitor Speaker

The internal speaker monitors the Voted and Priority transmit audio.

Test & Control Point

This 15 way D range connector is not used.

3.3 ADDITIONAL FEATURES

From serial number 1489 onwards additional components have been added to the audio interface PCB that offer the following features.

Transmit Inhibit

When used in a Chain configuration it is necessary to enable transmit inhibit to prevent TX lock-up. Links LK4 to LK7 have been provided on the voter distribution board for this purpose.

Watchdog Timer

A position has been created to fit a watchdog timer if required. This could be used to provide a “keep alive” pulse for a mobile voting system. The watchdog timer is not fitted.

CTCSS Module

Space has been made to fit a CTCSS encode module. This can be used to provide a common CTCSS encode tone for outgoing radio links. A CTCSS inhibit feature is provided which is linked to the watchdog timer to disable CTCSS during “keep alive” pulse. The CTCSS module is not provided.

SECTION 4 EXPANSION

4.1 INTRODUCTION

The A800V is a 4 channel unit with the ability to expand up to a maximum of 32 channels. Expansion is achieved by linking together A800V units until the desired channel capacity is reached.

When linking A800V units together it is necessary to designate one unit as the Master with the remaining units designated as Slaves. This ensures audio from all channels is compared to the same standard during the voting process.

4.2 MASTER/SLAVE CONFIGURATION

To convert a Master unit to a Slave carry out the following actions:

- a. Remove U21 from 4RV voter board. On later model Voters a storage position is provided on the audio interface board where the unused I.C. U21 may be stored.
- b. Remove links LK1, LK2, and LK3 from audio interface board. Refer to drawing A800VOT3.S06 for location of links.
- c. Clearly mark the unit as "Slave".

To convert from Slave to Master reverse the above procedure.

4.3 EXPANSION PORT

A 15 way "D" Range socket is fitted to the rear panel of the voter. To link voters together for increased channel capacity connect the expansion port sockets together with a suitable cable. If more than 2 voters are to be linked a ribbon cable can be used and the expansion ports linked in daisy-chain manner.

4.4 PRIORITY PORTS

Each 4 channel voter is fitted with a priority port, however, only one priority port should be used in a multi-voter system. If more than 1 priority port is used, transmit audio will not be present on all priority ports which may cause some operational difficulty. It does not matter which port is used.

4.5 POWER SUPPLY

Each 4 channel voter unit must be connected to a 13.8Volt DC supply. Even with the expansion ports linked each 4 channel voter must be powered independently. Note that an on/off switch and 1 amp fuse is fitted to each voter unit.

4.6 VOTE - LOCK SWITCH

Every 4 channel voter unit is provided with a vote-lock switch. When voters are linked by the expansion port, operation of any vote-lock switch will activate the vote-lock facility on all voters. With vote-lock active the lock LED will be illuminated on all voter units.

4.7 AUDIO LEVELS

In general, it should be possible to align each individual voter in a multi-voter system separately, each as a master, and then configure the slaves as required. The levels of the voters should not change once configured as a slave. There are a few points to note for this to be successful.

1. Check that the value of the A800V-P1-0x PCB (distribution PCB) resistor R40 is a 220K.
2. Check that the audio level coming out of each 4RV/2 (voter PCB) at "B – AUDIO OUT" is the same. Normally the 4RV/2 audio output should be approximately the same, as its audio output trimpot is left wound to full (maximum). Still it may be possible for the audio output level to vary slightly. The only way to correct this is to manually adjust that audio output level on any that do vary. If the audio level cannot be made the same as the other voters, check that the value of R6 on the 4RV/2 voter card is a 47K.

It is not essential to carry out any of the above steps. It is perfectly valid to configure the master and all of the slaves and then adjust the audio levels as a complete system. It would always be necessary to test the complete system anyway.

SECTION 5 ALIGNMENT

5.1 INTRODUCTION

The Voter module can be set-up in the workshop prior to field installation with only minor adjustments to line levels after final installation.

The nominal audio level of the system must be established before commencing alignment. For example, a narrow band (12.5 kHz channel spacing) radio link receiver correctly adjusted to give neg 10dBm of audio for 1 kHz modulation, deviating at 60% of rated maximum deviation, would be considered to have a nominal audio level of neg 10 dBm.

For correct voter operation it is essential that all equipment in the system is *correctly* set-up (transmitters, receivers, link equipment) with particular attention to setting of nominal audio levels.

5.2 ALIGNMENT PROCEDURE

In the following alignment procedures, a nominal line level of neg 10dBm is assumed.

Input Line Sensitivity

The input line calibration test points and input line sensitivity adjustments are on the front panel of the voter unit.

Apply earth to channel 1 receive gate line (S1 Pin3). Inject a 1 kHz audio signal, set to -10dBm, to channel 1 receive port (S1 Pins 1 & 2). Connect a high impedance voltmeter between channel 1 calibration point and ground on the front of the unit. A suitable probe must be carefully inserted into the test point to obtain a reading. Adjust channel 1 input level control for a reading of 7.2 volts DC on the voltmeter.

Repeat for channels 2, 3, and 4.

Final Level Adjustment

There are 4 level adjustment points accessed from the rear of the unit. A nominal level of - 10 dBm has been assumed. However, a wide range of adjustment is available. There may be, for example, a different level required from the Priority port to interface with a microwave bearer. Logical adjustment of the level controls, while ensuring correct impedance is maintained during set-up, is all that is required to maintain a good quality audio system.

It may be convenient to assemble a test cable. A 9 way "D" range plug with suitable 600 ohm load across pins 4 & 5 and flying leads from other pins is all that is required

The adjustments are:

- a. RV1 - Channel port TX audio out - Voted audio level
- b. RV2 - Channel port TX audio out - Priority audio level
- c. RV3 - Priority TX audio out
- d. RV4 - Priority RX audio in.

The normal order of adjustment is VR1, VR3, VR4, then finally VR2. Refer to audio level adjustment schematic - drawing VOTEADJ.S01.

VR1 - Channel Port TX Audio Out - Voted Audio Level

Apply an earth to channel 1 receive gate line (S1 Pin3). Inject a 1 kHz audio signal, set to -10dBm, to channel 1 receive port (S1 Pins 1 & 2). Terminate TX audio port (S1 pins 4 & 5) with 600 ohms. Adjust VR1 to -10dBm.

VR1 adjusts transmit audio level to all channel ports therefore it is not necessary to repeat the above adjustment for each channel.

VR3 - Priority TX Audio Out

Apply an earth to channel 1 receive gate line (S1 Pin3). Inject a 1 kHz audio signal, set to -10dBm, to channel 1 receive port (S1 Pins 1 & 2). Terminate Priority Port TX audio out (S5 pins 4 & 5) with 600 ohms. Adjust VR3 for required audio level out of the Priority Port.

VR4 - Priority Receive Audio In

This should be adjusted to balance the Priority Receive Audio at the monitor speaker with voted audio. The actual adjustment of VR4 is not critical as it mainly serves to balance the audio level in the speaker. Once set it should not require further adjustment. Final adjustment of Priority Receive Audio is achieved via VR2.

VR2 - Channel Port TX Audio Out - Priority Audio Level

This sets the audio level received from the Priority Port to a suitable level for transmission over the system.

Apply earth to Priority Port receive gate line (S5 Pin3). Inject a 1 kHz audio signal, set to the nominal audio level that will be received at the Priority Port receive audio in (S5 Pins 1 & 2). Terminate the transmit audio out (pins 4 & 5) of any channel port in 600 ohms. Adjust RV2 for -10dBm measured at the channel audio port.

Note that if VR4 (Priority Receive Audio) is adjusted, VR2 will require resetting to maintain the correct Priority Audio level for transmission.

SECTION 6 A800V PARTS LIST**A800V-P1-01 Distribution PCB**

Ref. No.	Description	Part No.	Supplier	Qty
A800V-P1-04	Distribution PCB	A800V-P4-01	AEMS/ENA	1
C1, 2, 4, 5, 8, 12, 18, 26	47uF Electro 35 Volt	228-643	Farnell	8
C3, 6, 7, 10, 15	100nF Chip Cap 1206 Ceramic	499-687	Farnell	5
C9, 14	220uF Electro 35 Volt	228-667	Farnell	2
C11, 13, 19, 23, 24, 25	1uF 16V Tant ChipCap TAJ Series, Case A	498-701	Farnell	6
C20, 21, 22	100uF Electro, 35 Volt	228-655	Farnell	3
C27	100P Chip Cap 0805 Ceramic	499-171	Farnell	3
D1, 2, 8, 9, 10,12	BAW56 Diode, SOT-23	741-863	Farnell	6
D3	1N5404	365-348	Farnell	1
D4	Zener 18V 5W 1N5355B	370-708	Farnell	1
D5, 6, 7	3 mm Red Led	472-281	Farnell	3
D11	1N4001	365-117	Farnell	1
F1	RXE075 Polyswitch 0.75A	608-877	Farnell	1
IC1, 2, 3	TDA7231 1.6 W Audio Amp	002-00014-05	Tait	3
IC4	LM358M, SMD, SO8, Op Amp	399-565	Farnell	1
IC5	CD4066BCM, SMD, SO-14	505-353	Farnell	1
J1 to 9	Header Jumpers	150-410	Farnell	9
LK 1 to 9	Pin Strip, one 36 way pin strip	528-419	Farnell	1
Q1, 2, 3, 4, 5	BC817-40 NPN Transistor, SMD, SOT-23	506-308	Farnell	5
Q6, 7, 8, 9	BCW70/BC857-215, SMD SOT23, PNP	516-806	Farnell	4
R1, 2, 3, 4, 6, 7, 8, 9, 11, 12, 13, 14, 16, 17, 18, 19, 21, 22, 23, 24, 51, 52, 53, 54, 55, 56, 57,	1K2 Chip Resistor 0805 1/8W 5%	515-176	Farnell	27
R5, 10, 15, 20, 25, 35, 50, 58, 71, 72	10K Chip Resistor 0805 5%.	109-318	Farnell	10
R26, 27, 28, 29, 30, 31, 32, 33, 34, 37, 39, 44, 47, 66, 67, 68, 69, 70	47K Chip Resistor 0805 1/8W 5%	109-322	Farnell	18
R36, 38, 41, 43, 46, 49, 59, 60	100K Resistor 0805 5%	109-324	Farnell	8
R40	220K Resistor 0805 5%	109-326	Farnell	1
R42, 45, 48	4R7 Chip Resistor 0805 1/8W 1%	SMRC12H4R7	St Lucia	3
R61, 62, 63, 64, 65	1M Chip Resistor 0805 1/8W 5%	109-330	Farnell	5
R73	220R Chip Resistor 1218 1W 5% or 220R Chip Resistor 2512 1W 5%	507-880 325-8026	Farnell	1
R74 (*R75 not fitted)	0R Chip Resistor 0805 1/8W 1%	109-299	Farnell	1
S1, 2, 3, 4, 5	9 Way D Range R/A Female, PCB Connector	892-452	Farnell	5
S6, 7	15 Way Skt, D Range, PCB, R/A	892-464	Farnell	2
S8	40 Way IDC, PCB Header, Straight	864-742	Farnell	1
S9, 12, 13	10 Way IDC, PCB Header, Straight	864-687	Farnell	3
S10, 11	2 Pin Horizontal PCB Header	889-623	Farnell	2
T1 to T10	ETAL P2781 Transformer 600:600 Ohms, SMD.	523-100	Farnell	10
Terminal Pins	Terminal Pins	433-860	RS	3
U21	IC Socket, 8 Way, Machined Pins	738-517	Farnell	1
VR1, 2, 3, 4	10K, 10 - 22 Turn, Upright, Side Adjust	348-879	Farnell	4

A800V-P2-01 Front Panel PCB

Ref. No.	Description	Part No.	Supplier	Qty
A800V-P2-01	Front Panel PCB	A800V-P2-01	AEMS	1
D100	3 mm Yellow Led	178-305	Farnell	1
D101	3 mm Green Led	178-304	Farnell	1
D102	3 mm Red Led	472-281	Farnell	1
Q100	BC557	BC557	Farnell	1
R100	680E Resistor 1/4 Watt 5%	MRS25680E	Farnell	1
R101, 102	1K Resistor 1/4 Watt 5%	MRS251K	Farnell	2
R103, 104, 105	47K Resistor 1/4 Watt 5%	MRS2547K	Farnell	3
S100	10 Way IDC, PCB Header, Straight	864-687	Farnell	1
S101	Test Point, removed from 4RV/2 Voter PCB	N/A	N/A	1
SW100	Switch	P7686	DS	1
Terminal Pins	Terminal Pins	433-860	RS	1
VR100	10K, 16 mm 1W Ceramic Pot	173-631	RS	1

A800V-P3-01 4RV/2 Adapter PCB

Ref. No.	Description	Part No.	Supplier	Qty
A800V-P3-01	4RV/2 Adapter PCB	A800V-P3-01	AEMS	1
S8A	40 Way IDC, PCB Header, Straight	864-742	Farnell	1
S8B	22 Way Direct PCB Edge Connector	483-871	RS	1

4RV/2 Voter PCB

Ref. No.	Description	Part No.	Supplier	Qty
DHE-C-4RV/2	Doug Hall Voter PCB Complete	DHE-C-4RV/2	Tait	1

Cables and Connectors

Ref. No.	Description	Part No.	Supplier	Qty
Ribbon	40 Way Ribbon Cable	-	AEMS	50mm
Ribbon	15 Way Ribbon Cable	-	AEMS	150mm
Ribbon	10 Way Ribbon Cable	-	AEMS	200mm
Figure 8 Speaker Cable	Figure 8 Speaker Cable 702	710-167	Farnell	200mm
Figure 8 Power Cable	Figure 8 Power Cable, Red & Black 1402.	297-860	Farnell	2m
P8, 8A	IDC 40 Way Cable Mount Connector	249-026	Farnell	2
P9, P100	IDC 10 Way Cable Mount Connector	248-964	Farnell	2
P10, 11	2 Way Cable Mount Screw Terminal Block	963-021	Farnell	2
P6A & P6B	DB15 Male Crimp Connector	460-151	Farnell	2

Mechanical Parts

Description	Part No.	Supplier	Qty.
A800V 19 Inch Rack Box	A800V-M0-01	Tait	1
Knob, 16mm, Mat Black Anodised, for 6.35mm shaft	225-704	RS	1
M3 x 12mm Hexagonal Brass Nickel Plated Spacers	517-550	Farnell	29
M3 x 6mm Pan Phillips Screws, Zinc Plated	-	AEMS	21
M3 x 8mm Counter Sunk Pozi Screws, Zinc Plated	-	AEMS	13
M3 Flat Washers, Zinc Plated	-	AEMS	8
M3 Internal Star Washers Zinc Plated	-	AEMS	4
M3 Nuts Zinc Plated	-	AEMS	4
Silicon Tubing, Clear/White, 3mm.	-	AEMS	15mm
M4 Solder Lug	186-7848	RS	1
Speaker, 4 Ohms, 2W, 71 x 41 mm	250-00010-19	Tait	1
Speaker Grill, Black	307-01015-01	Tait	1

Parts Packaged with each A800V

Description	Part No.	Supplier	Qty.
Service Manual AM800Vx	AM800Vx.pdf	Tait	1
DB9 Male Connector Solder Pot	150-808	Farnell	5
DB9 Male Cover	150-773	Farnell	5
Power Cable (P10 and Figure 8 Power Cable from " Cables and Connectors " above).	-	-	1

Note: Component Marked * are not always fitted.

SECTION 7 DRAWINGS

DISTRIBUTION PCB

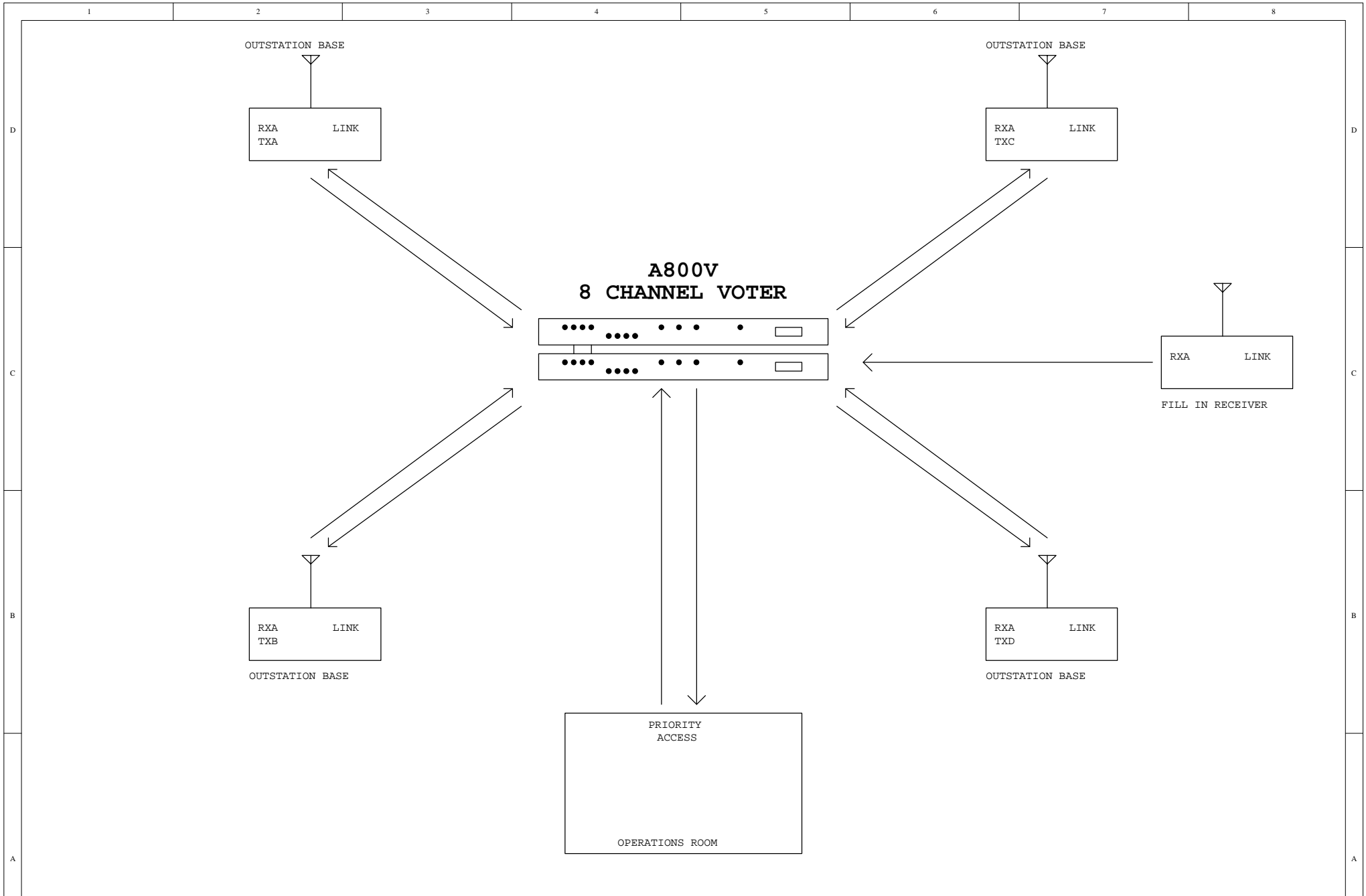
Early model distribution PCBs have a slightly different component layout.

For Voter serial numbers 1464 - 1468 inclusive refer to diagram A800VOT1.PCB

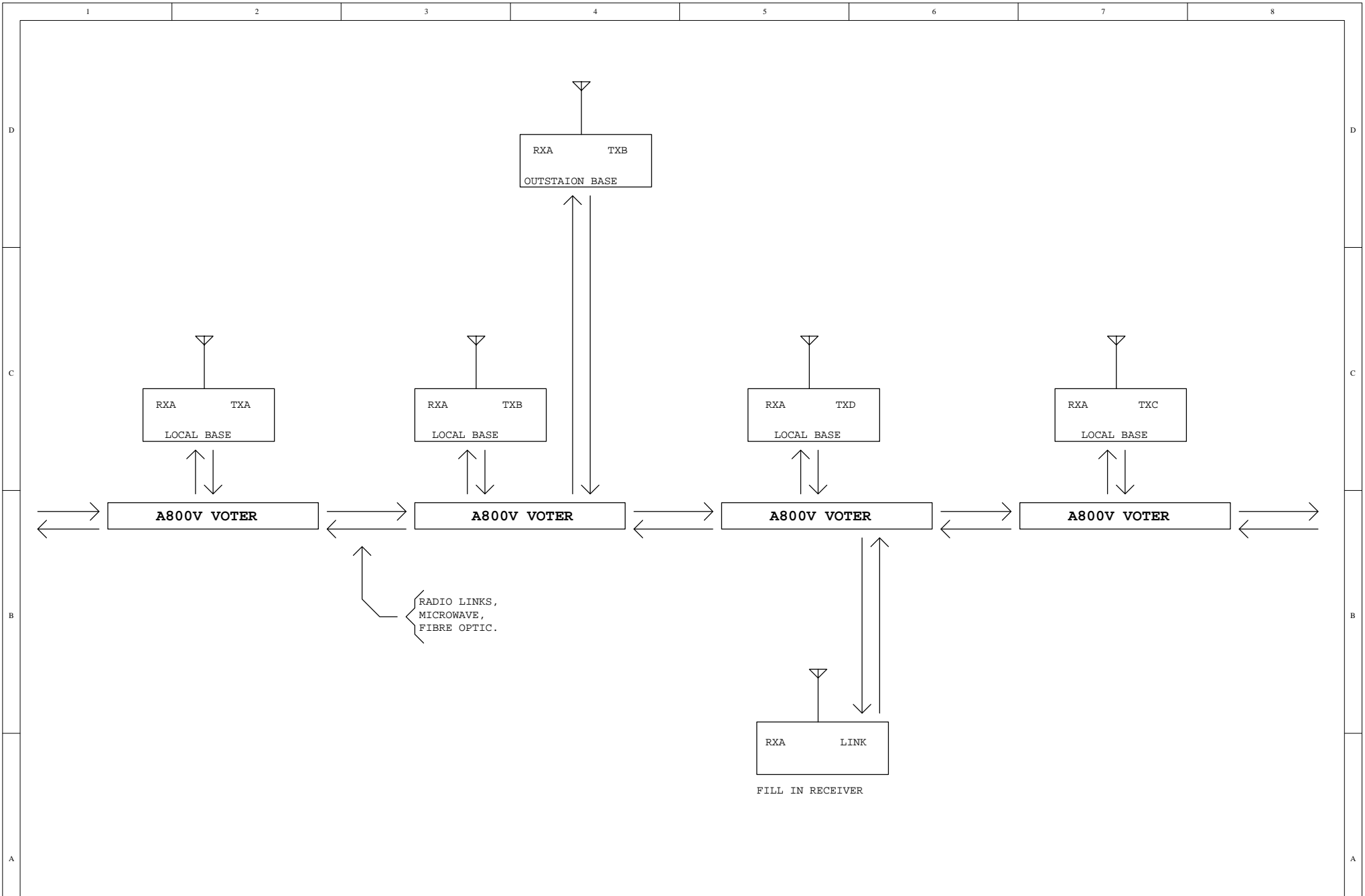
For serials numbers 1469 onwards refer to diagram A800VOT2.PCB

DRAWING LIST

Voter Hub System Overview	A800VOTA.S01
Voter Chain System Overview	A800VOTB.S01
Rear Panel Detail	A800VOT7.S01
Front Panel Detail	A800VOT6.S04
A800V 19" Box Layout	A800VBLT.SCH
Audio Adjustment Schematic	VOTERADJ.S01
Distribution Circuit	A800VOTE.S01
TX Inhibit and Tone Encode Circuit	A800VTEX.S01
Front Panel Circuit	A800VTFP.S02
Front Panel PCB Layout	A800VTFP.PCB
Master/Slave Link Location	A800VOT3.S06
Distribution PCB Layout	A800VOT1.PCB
Distribution PCB Layout (Early Model)	A800VOT2.PCB



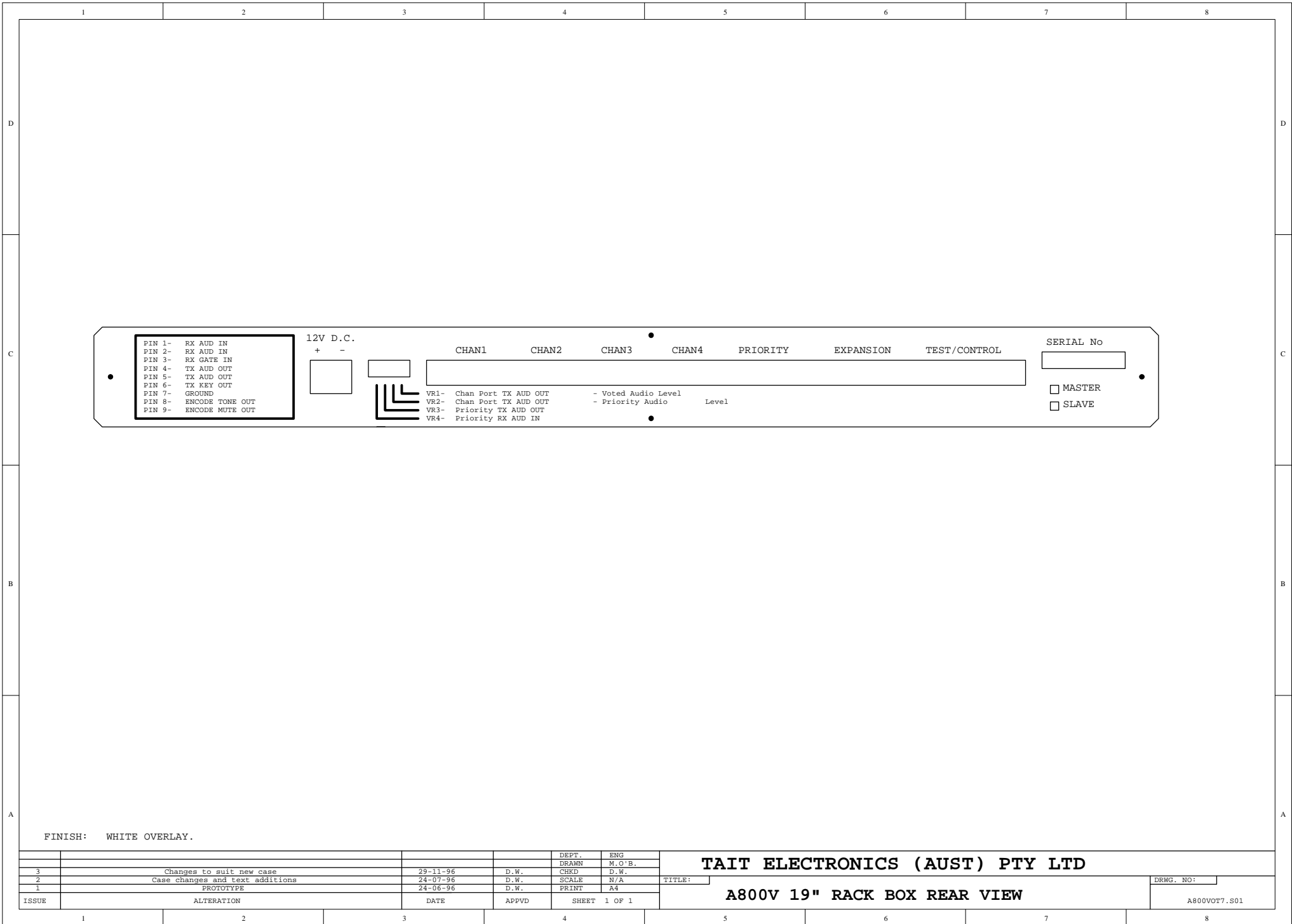
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				CHKD	D.W.						
				SCALE	N/A						
1	Original	21-10-96	R.V.	PRINT	A4	TITLE:					
ISSUE	ALTERATION	DATE	APPVD	SHEET	1 OF 1						



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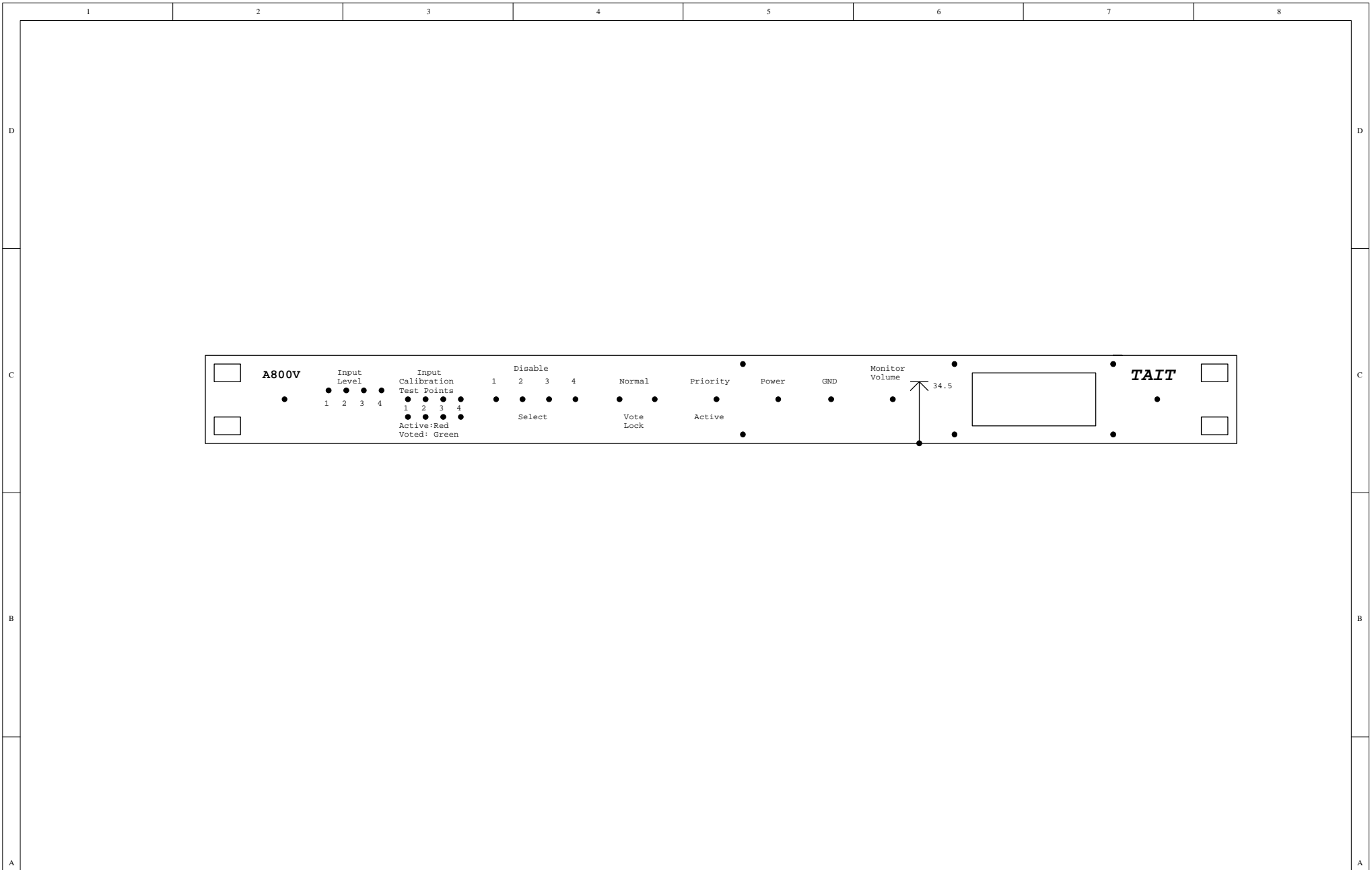
A800VOTE VOTER CHAIN SYSTEM OVERVIEW

DRWG. NO:
A800VOTB.S01



FINISH: WHITE OVERLAY.

				DEPT.	ENG	TAIT ELECTRONICS (AUST) PTY LTD	
				DRAWN	M.O.B.		
3	Changes to suit new case	29-11-96	D.W.	CHKD	D.W.		
2	Case changes and text additions	24-07-96	D.W.	SCALE	N/A		TITLE:
1	PROTOTYPE	24-06-96	D.W.	PRINT	A4		DRWG. NO:
ISSUE	ALTERATION	DATE	APPVD	SHEET 1 OF 1		A800V 19" RACK BOX REAR VIEW	A800VOT7.S01



FINISH: BLACK OVERLAY.

DEPT.	ENG
DRAWN	M.O.B.
CHKD	D.W.
SCALE	N/A
PRINT	A4
SHEET 6 OF 6	

TAIT ELECTRONICS (AUST) PTY LTD

TITLE:

A800V 19" RACK BOX FRONT PANEL OVERLAY

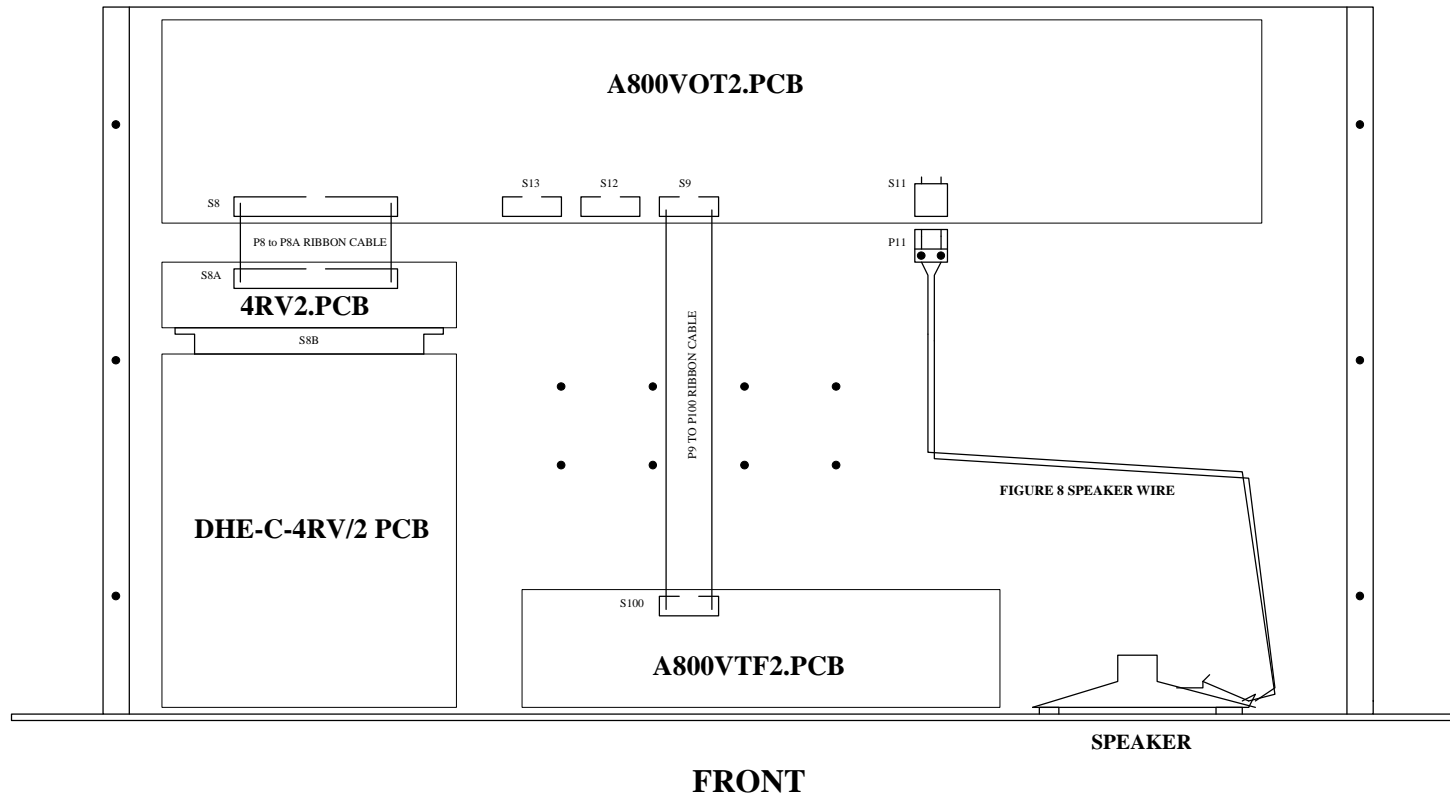
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ISSUE	ALTERATION	DATE	APPVD
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A800V 19" Rack Box Top View

REAR



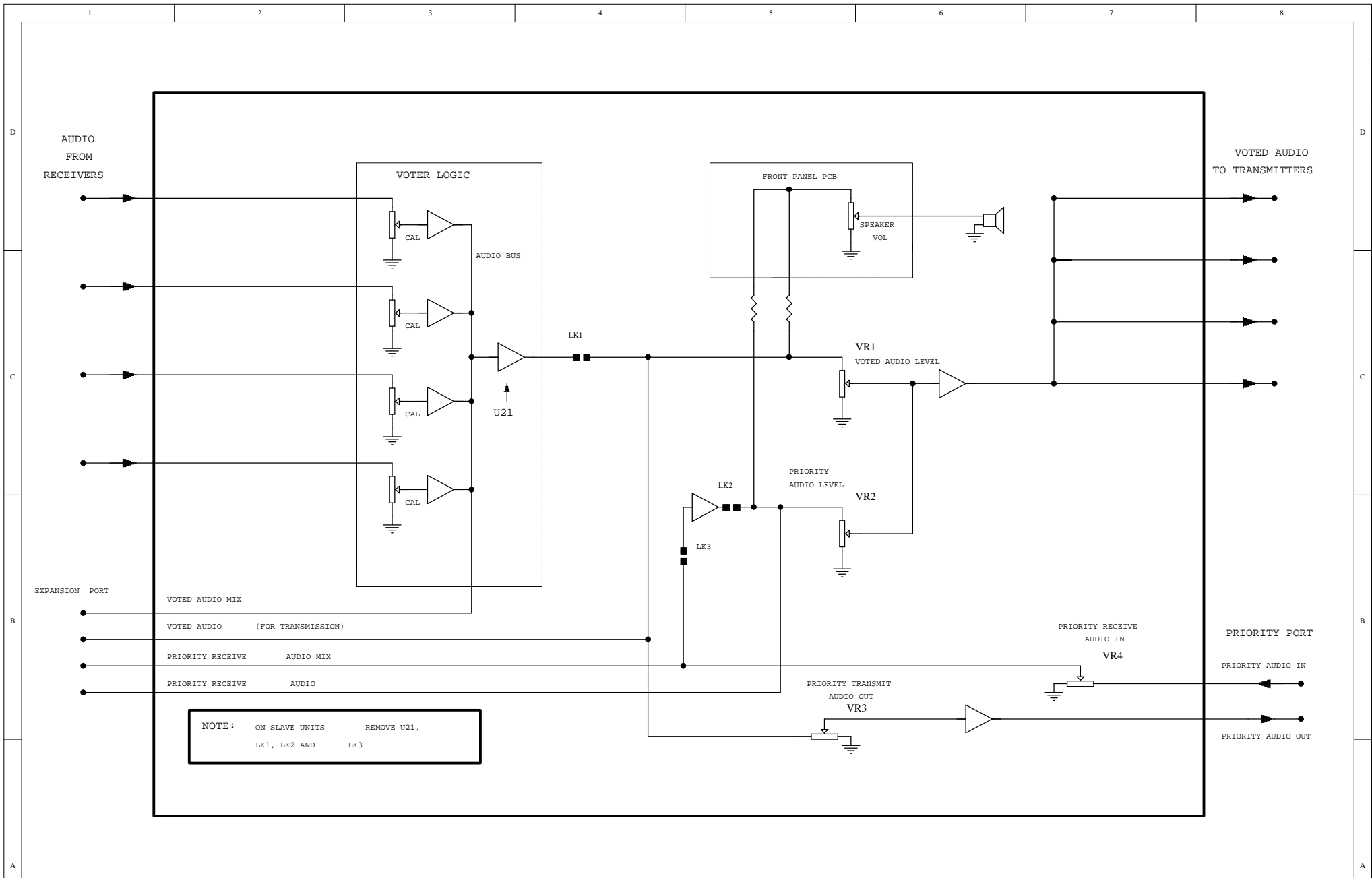
Tait Electronics (Aust) PTY LTD

Title: **A800V 19" RACK BOX TOP VIEW**

Size: A3	Number: A800VBLT	Revision: V 1.0
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Drawn By: M.O.B.	Checked By: M.O.B.
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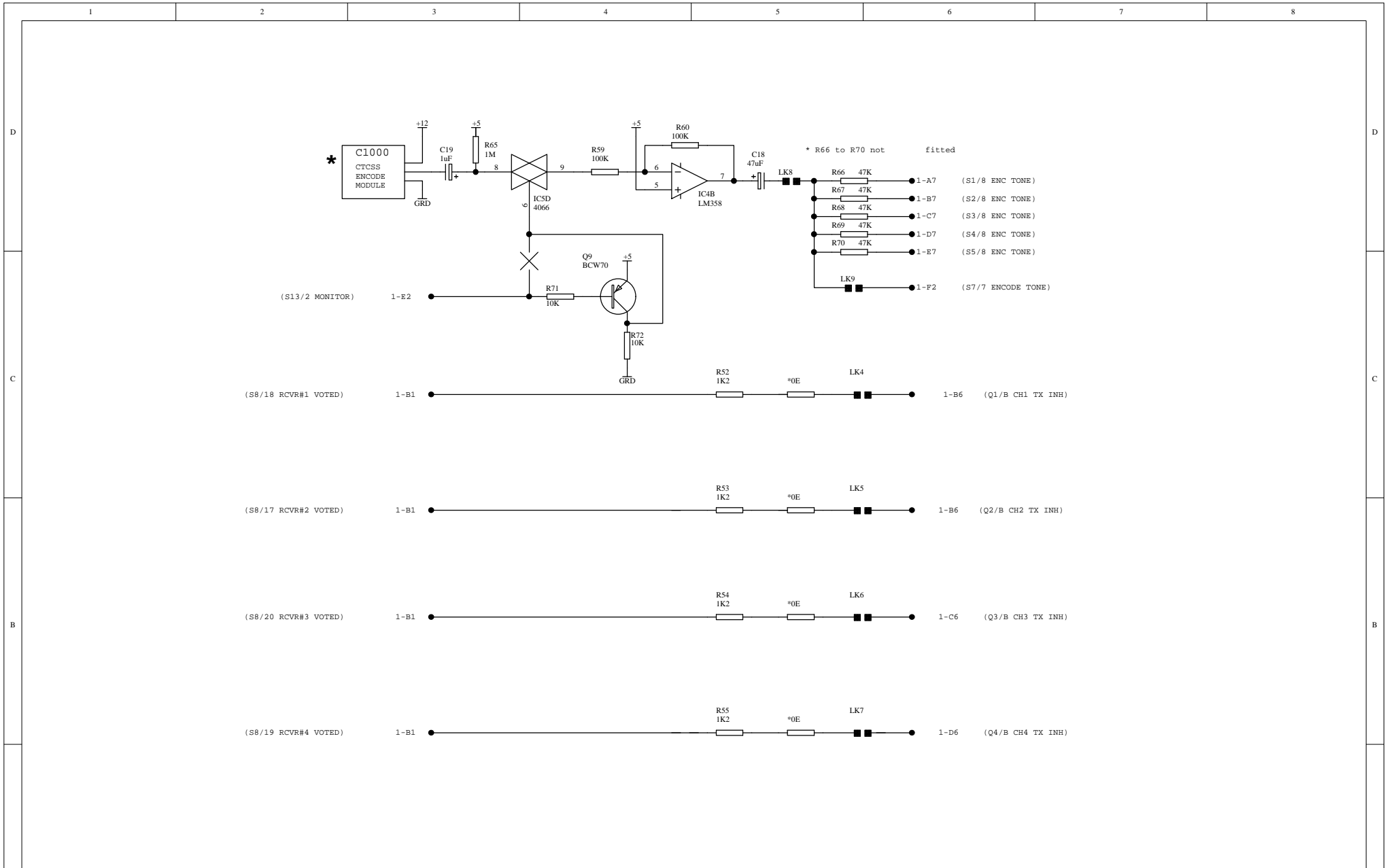
NOTE: ON SLAVE UNITS REMOVE U21,
LK1, LK2 AND LK3

				DEPT.	SYSTEMS
				DRAWN	DW
				CHKD	MOB
				SCALE	N.T.S.
1	ORIGINAL	9 DEC 96	RV	PRINT	A 4
ISSUE	ALTERATION	DATE	APPVD	SHEET 1	OF 1

TAIT ELECTRONICS (AUST) PTY LTD

A800V AUDIO LEVEL ADJUSTMENT SCHEMATIC

TITLE: _____
DRWG. NO: _____
VOTERADJ.S01



Note: * = Not Fitted

ISSUE	ALTERATION	DATE	APPVD	SHEET	2 OF 3
2	Q9 added to invert IC5 pin 6	26-03-98	R.V.	SCALE	N/A
1	ORIGINAL	07-01-97	R.V.	PRINT	A4

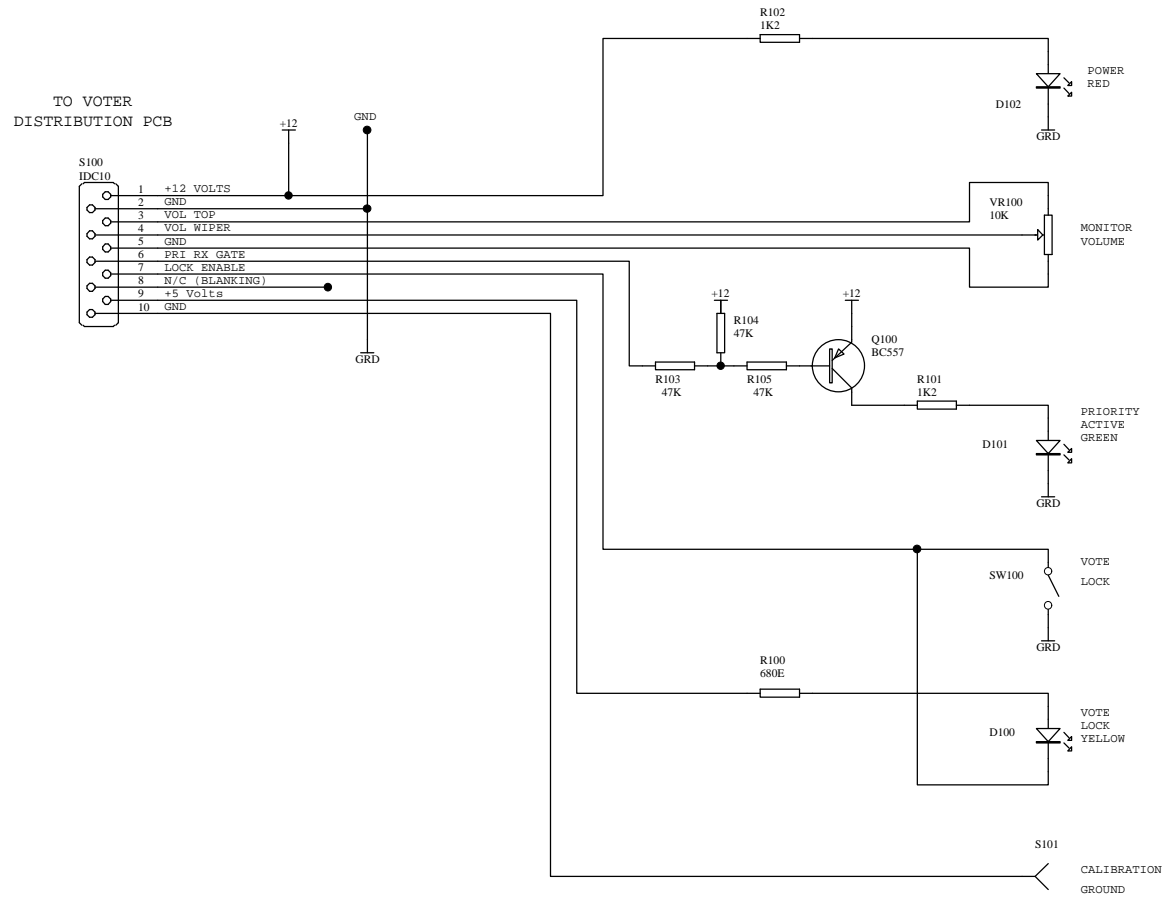
TAIT ELECTRONICS (AUST) PTY LTD

TITLE A800V 4 CHANNEL VOTER DISTRIBUTION PCB - TX INH & ENC TONE

DRWG. NO:

A800VTEX.S02

FRONT PANEL PCB

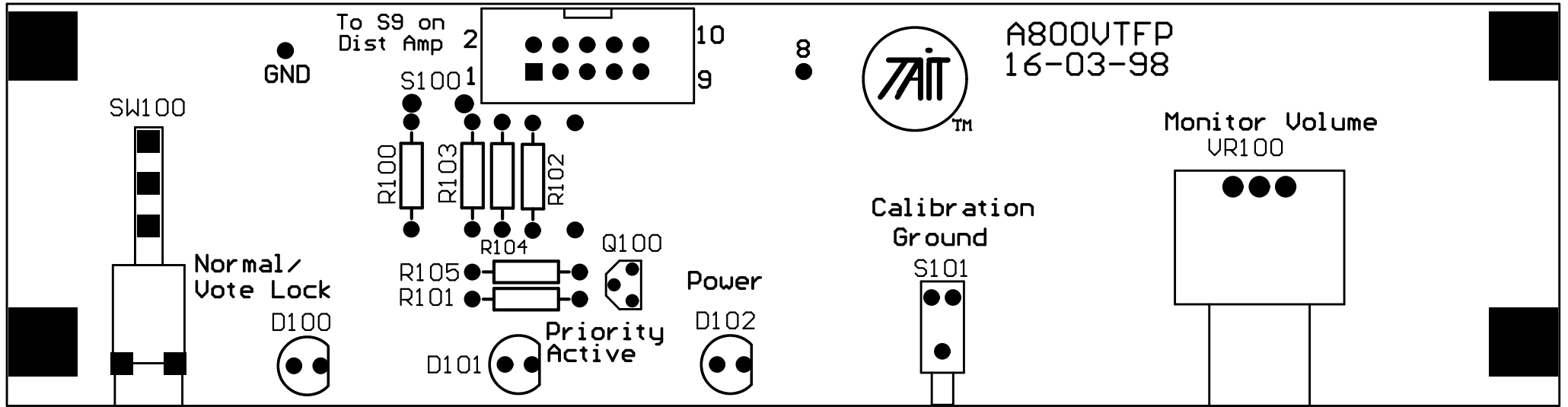


ISSUE	ALTERATION	DATE	APPVD	SHEET	3 OF 3
3	Priority LED Components Added	21-03-97	R.V.	DEPT. DRAWN	ENG. M.O'B.
2	ORIGINAL	07-01-97	R.V.	CHRD	DOW
1	PROTOTYPE	22-07-96	R.V.	SCALE	N/A

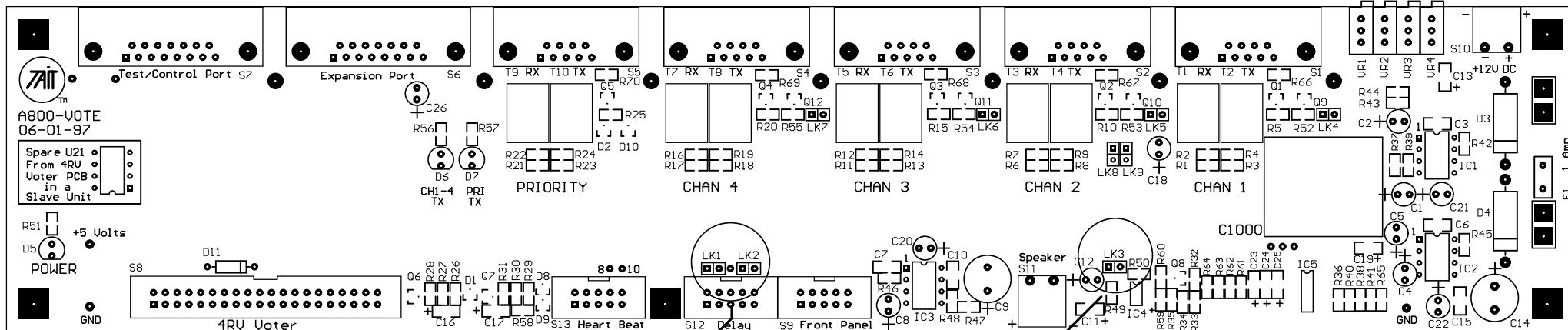
TAIT ELECTRONICS (AUST) PTY LTD

A800V VOTER FRONT PANEL PCB

DRWG. NO: A800VTFP.S03

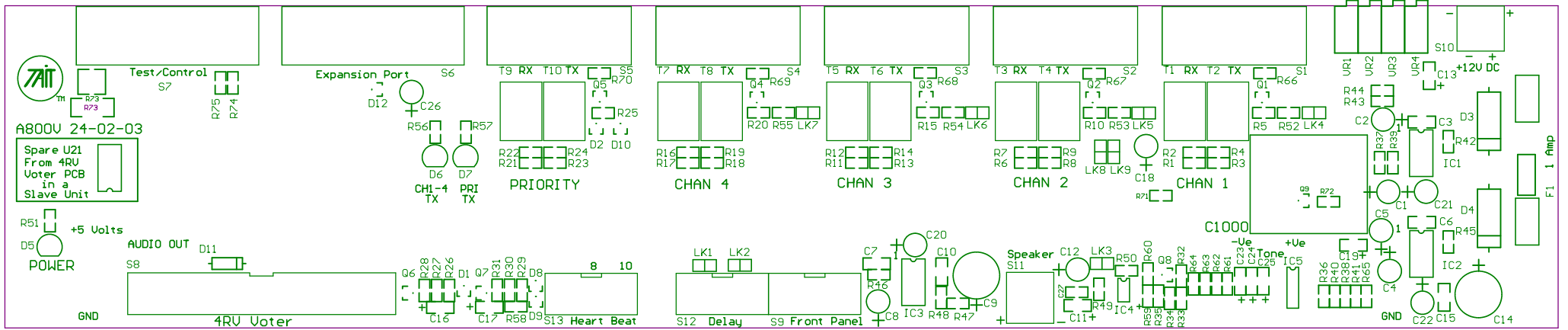


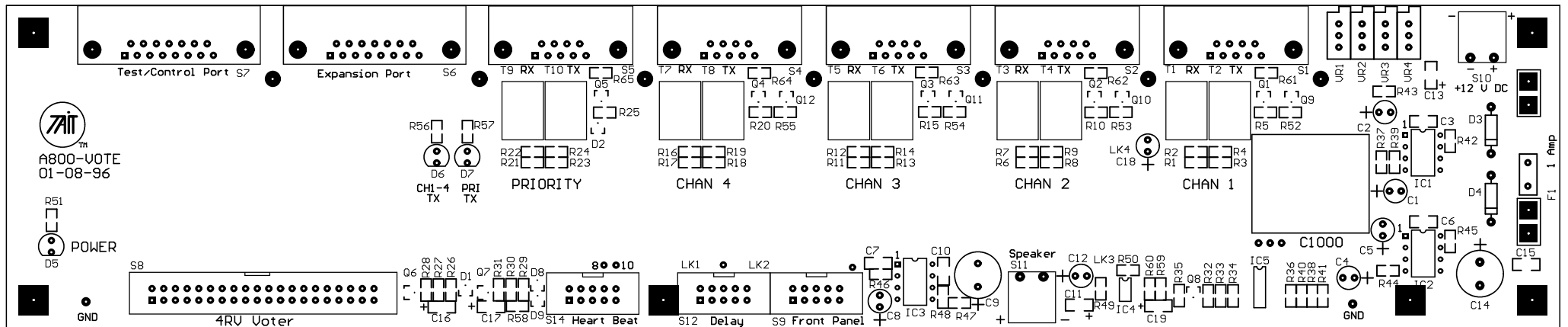
A800V Voter Front Panel PCB Overlay



Master/Slave Links LK1, 2 and 3

A800V Master/Slave Link Locations





A800 Voter Distribution PCB Overlay - Early Model

ANNEX A - BASE VOTING SYSTEMS

Individual receivers, when used in mobile radio services, have fixed coverage areas. In general, receivers and their associated transmitters in repeater base station systems are co-sited, and coverage is precisely defined and restricted to the coverage of the single receiver. In many cases, the transmitter's coverage far exceeds that of the receiver.

With the increased use of handheld radios in mobile radio service, the limitations of the base receivers have become even more apparent, since handheld transmitters have considerably lower output power levels, and less efficient antennas than their mobile counterparts, while their receivers are generally equal in performance to a mobile radio receiver.

As a result, it has become desirable to site remote receivers around the required coverage area and connect these via a voting system to the base station and/or repeater transmitter. The voting system selects the best received signal available.

Several voting systems are available. They include:

Signal strength voting - the strongest signal is voted, with continuous checking.

Delay voting - Signal strength voting, but once per transmission only. The voters (1 per receiver) delay the onward audio signal path, the weaker the signal the longer the delay.

Sinad Voting - The signal with the best sinad (signal-to-noise ratio) is selected.

Using signal strength only as a voting criteria may not give the best result, since local noise at a receiver site, or high flutter on the received signal, may result in the signal strength criteria being met, but an unusable signal being received.

Delay voting has similar problems to those of the ordinary signal strength system, but has the advantage of simplicity. However, if all receivers are receiving weak signals, lengthy delays can result before final voting occurs and the signal is heard.

Sinad voting relies on selecting the received audio signal with the best signal to noise ratio. Voting can be done either continuously, at very high rates, even on each speech syllable, or if required, once per transmission. This Sinad voting is the system used by the Tait A800V unit.



A800-TD Ver1.1

Talk-through Default Module

Introduction

The A800-TD Talk-through Default Module is intended for use with the A800V Sinad Voter and Tait T800 base equipment. Radio networks using a Tait A800V voter have the repeat function mediated by the voter, normally located at the network hub. Failure of the interconnecting links or of the voter would result in a major system failure. To minimise the impact, A800-TD modules are fitted to each repeater which enable the repeater to default to talk through mode in the event of a link or voter failure. The A800-TD module was formally known as a 'Repeat Fail' module (A800-RF). Version 1.1 of the A800-TD is specifically packaged to suit the T800 Series II base stations, but can be easily applied to almost any radio equipment.

Operation

A A800-TD module should be fitted to each repeater in a base voting system. It is located between the base station and its link, and mediates the audio, PTT and Rx Gate functions. In normal operation, audio is received from the base station receiver and passed down the link to the voter. Audio is then voted and returned over the link for re-transmission. If a received signal is sent from the base station to the voter, but does not return back up the link for re-transmission, the A800-TD Talk Through module reverts the base to local talk through mode. In local talk through mode, the bases received audio is retransmitted directly, by its own base station transmitter. The received audio continues to be sent down the link when the repeater is in local talk through mode.

The decision as to whether the link path has failed is determined by looking at the local links receive gate. If the local base station receive gate becomes active but the link receive gate does not, then local talk through is left engaged. When the link becomes active during a transmission, local talk-through mode is cancelled and the system reverts to normal operation. As audio switching is achieved by an electronic switch the change-over is extremely rapid.

The A800-TD is an unbalanced unity gain module for both audio in and audio out on both ports. This means there are no levels to adjust. The module is suitable for system audio levels up to 0dBm.

The A800-TD module can also be fitted to base stations which are co-sited with voter (central voter hub site). In such a case, the link port on the A800-TD is connected to one of the channel ports on the A800V Sinad Voter. In such a case, the Rx and Tx lines will need to be crossed over, as will the Rx Gate and PTT line.

Installation

For use with T800 Series II base stations with T800-50-0000 Standard Backplane boards:

1. Mount the A800-TD to one of the guide rails on the top of the rack-frame using the counter sunk screws, washers and nuts supplied, as per Fig. 1.
2. Plug the leads supplied into each end of the A800-TD and the other ends of the cables into each backplane. Both cables are identical, so either cable can go on either end of the A800-TD.
3. Connect the figure 8 power wire from the A800-TD to the +13.8V supply on the rack.
4. If it is not desirable to common the Serial Com lines between the base and the link, then remove link LK2 in the A800-TD.
5. No level adjustment of the A800-TD is required. Setup up the base & link line levels as per normal. The link LK1 in the A800-TD is provided to temporarily enable the bases repeat audio while setting up line levels

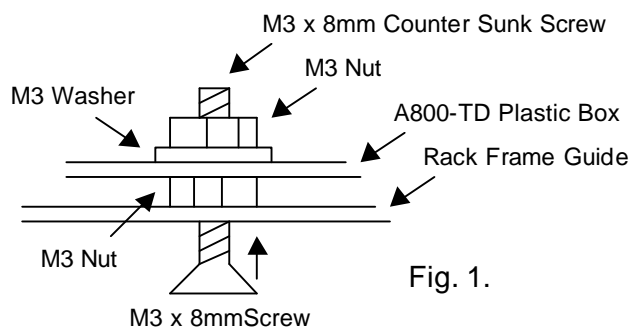


Fig. 1.

6. Parts List

A800-TD PCB

Ref. No.	Description	Part No.	Supplier	Qty
A800-TD PCB	A800-TD PCB	A800-TD1.pcb	Oz Elec.	1
C1, C3, C4, C5, C6	10uF Electro 35 Volt	228-618	Farnell	5
C2	100nF Poly	146-079	Farnell	1
C7	100pF Ceramic Chip Cap, 0805	499-171	Farnell	1
D1, D2, D3	1N4148	386-106	Farnell	3
GND	1mm Test Pin	433-860	RS	1
IC1	CD4066	573-772	Farnell	1
IC2	TL072	401-158	Farnell	1
J1, J2	Header Jumpers for Links LK1 & LK2.	150-410	Farnell	2
LK1, LK2	2 Pins of a 36 Way Pin Strip, 0.1" Spacing, Gold Plated Pins	528-419	Farnell	2
R1, R2	4K7 Resistor 0.25W 1%	543-548	Farnell	2
R3, R4	1K2 Resistor 0.25W 1%	543-408	Farnell	2
R5, R6, R7, R8, R9	100K Resistor 0.25W 1%	543-860	Farnell	5
S1	Two way terminal block, PCB mount	151-789	Farnell	1
SK1, 2	9 Way Socket, D Range, Right Angle PCB Mount	892-452	Farnell	2

Cables & Connectors

Ref. No.	Description	Part No.	Supplier	Qty
Power Cable	Figure 8 Power Cable, 1402	710-167	Oz Elec.	1.1m
Multi-core	9 Core Multi-core Cable	-	Oz Elec.	1.2m
P1, P2	DB9 Male Solder Connector, for external cables.	150-808	Farnell	2
P3, P4	DB25 Male Solder Connector, for external cables.	150-810	Farnell	2
-	DB9 Connector Cover, for external cables.	-	Oz Elec.	2
-	DB25 Connector Cover, for external cables.	-	Oz Elec.	2

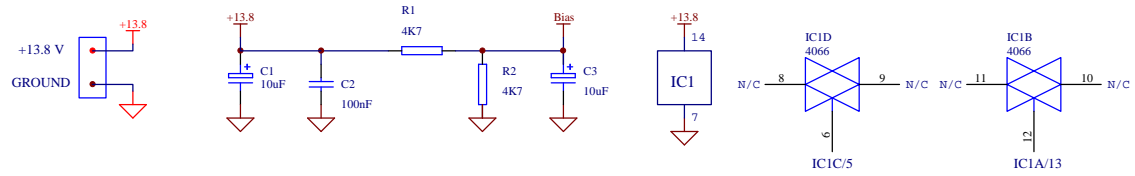
Parts Packaged with each A800-TD

Ref. No.	Description	Part No.	Supplier	Qty
AM800-TD	AM800-TD Service Manual	AM800-TD.pdf	Oz Elec.	1
-	DB9M to DB25M Cables. Parts as per 'Cables & Connectors	-	Oz Elec.	2
-	M3 x 8mm Counter Sunk Pozi Screws, Zinc Plated	-	Oz Elec.	2
-	M3 Flat Washers, Zinc Plated	-	Oz Elec.	2
-	M3 Nuts Zinc Plated	-	Oz Elec.	2

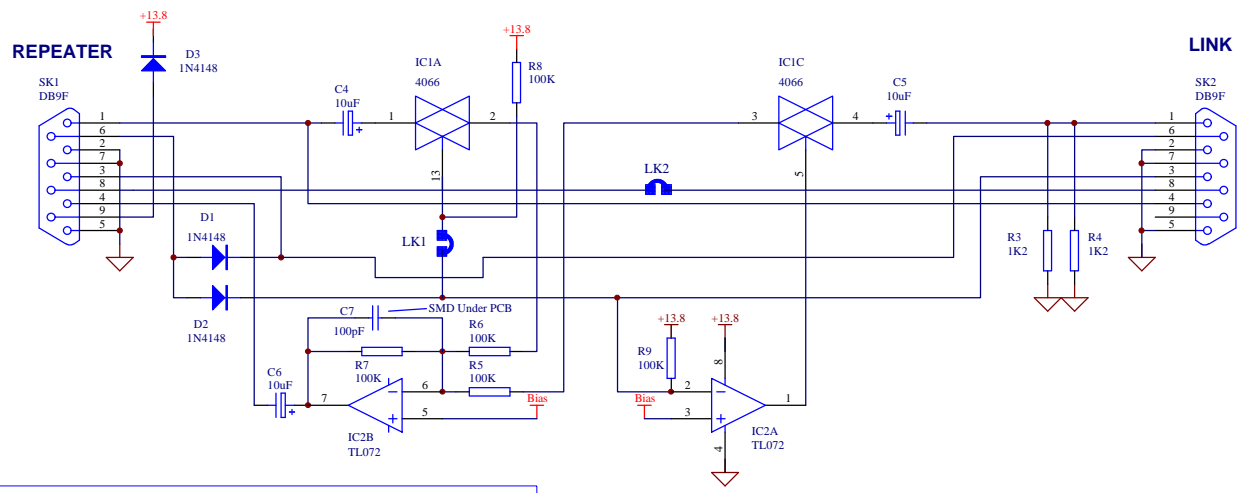
Miscellaneous Parts

Description	Part No.	Supplier	Qty
Cable Tie, White, 100-120mm	-	Oz Elec.	2
Medium Anti-Static bag	-	Oz Elec.	1
Rubber Grommet, Chassis Hole 9.5mm, Cable Hole 6mm	HP-0752	Jaycar	1
Small Ziplock bag, for nuts bolts & screw	-	Oz Elec.	1
Zippy Box, Black, 83 x 54 x 28	HB-6025	Jaycar	1

External Power

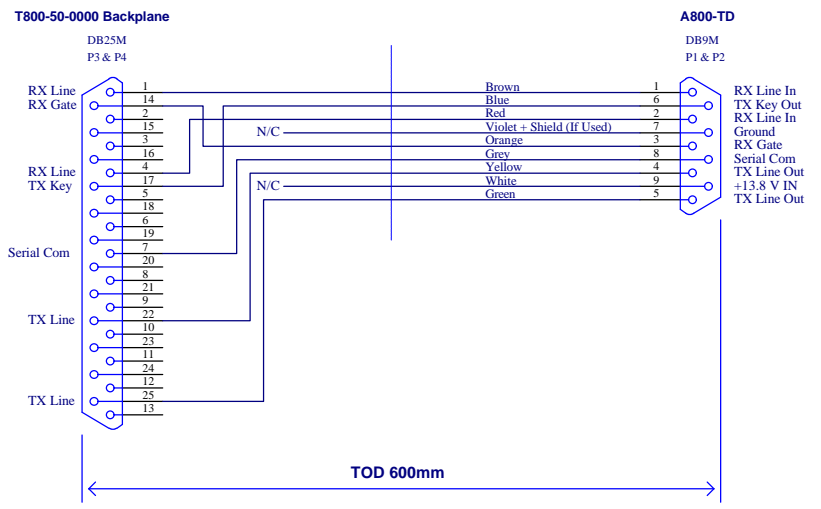


- REPEATER DB9 CONNECTIONS**
- 1 RX AUD IN
 - 2 RX AUD IN
 - 3 RX GATE IN
 - 4 TX AUD OUT
 - 5 TX AUD OUT
 - 6 TX KEY OUT
 - 7 GROUND
 - 8 SERIAL COM
 - 9 +13.8 V IN



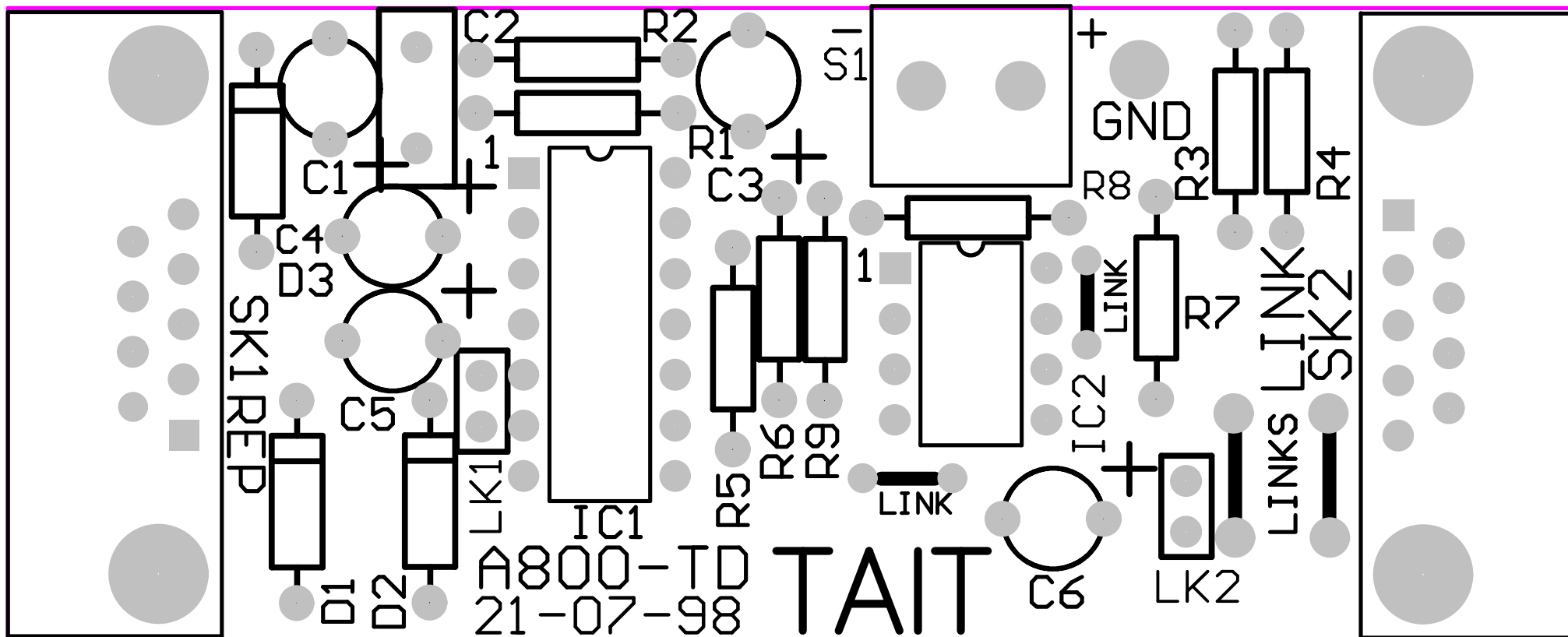
- LINK DB9 CONNECTIONS**
- 1 RX AUD IN
 - 2 RX AUD IN
 - 3 RX GATE IN
 - 4 TX AUD OUT
 - 5 TX AUD OUT
 - 6 TX KEY OUT
 - 7 GROUND
 - 8 SERIAL COM
 - 9 N/C

Repeater & Link Cables



LK1 - Repeater Test Link. Removing this link enables the repeat audio path permanently. Default = In.
LK2 - Serial Com Link. This connects the Serial Com line from the repeater to the link. This is for T800 II bases only. Default = In.

Tait Electronics (Aust) Pty Ltd		
Title: T800 Talk-through Default Module		
Size: A3	Number: A800-TD	Revision: 1.1
Drawn By: M.O'B.	Checked By: M.O'B.	
Date: 21-05-01	Sheet 1 of 1	
File: A8-TD-C1-02.sch		



A800-TD Top Overlay V1.1

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