

## 8.14 T2000-80 Line Interface Kit

The T2000-80 line interface kit enables connection of the T2000 receiver and transmitter audio circuitry to a two wire transmission line. The line interface PCB is mounted in the options position inside the T2000 Series II radio, and is application configurable using PCB links.

The following topics are covered in this Section:

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## 8.14.1 Components Required

The T2000-80 kit contains the following components:

Quantity	Description
1	T2000-80 Line Interface PCB assembly
1	15-way high density D-range plug
1	shroud (alternative shroud - not required for T2000 Series II radios)
28	0 $\Omega$ chip resistors
1	1 $\mu$ capacitor (*C64)
1	4 $\mu$ 7 capacitor (*C60)
3	M3x8 pan Pozi Taptite screws
2	4-40x $\frac{1}{4}$ pan Pozi Taptite screws (black)

## 8.14.2 Fitting

- 1 Refer to Figure 8.14.1.

Remove the top cover of the radio by unscrewing the four cover screws, unclip the D-range blanking plate in the rear of the T2000 radio, unscrew the logic PCB and fold-out.

Position the T2000-80 PCB as shown, and connect the Micromatch connectors P13 and P14 to S13 and S14 on the T2000 logic PCB.

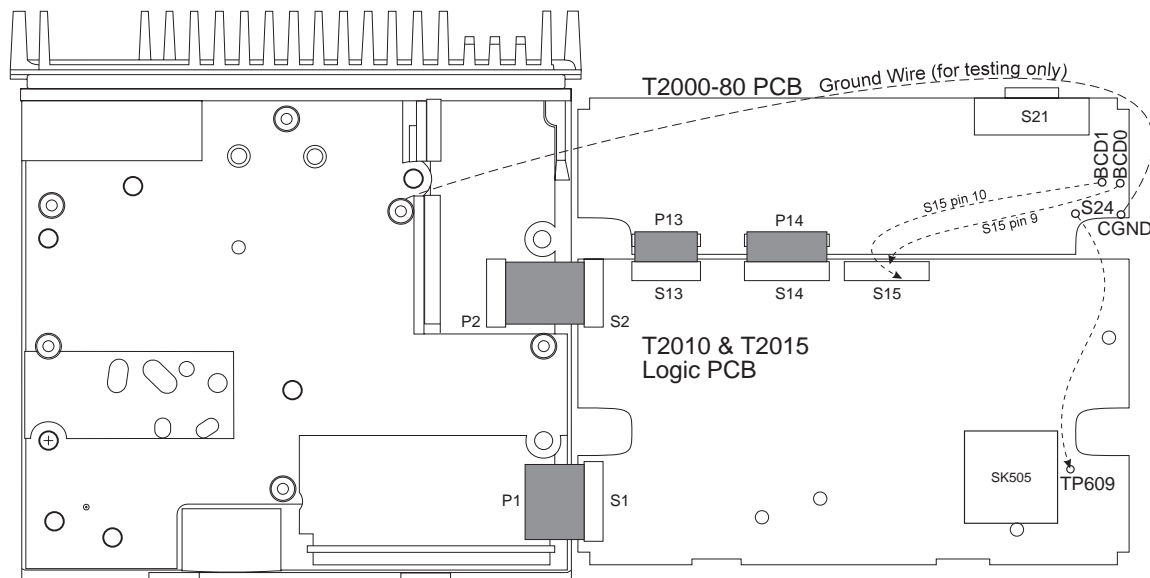


Figure 8.14.1 T2000-80 Line Interface PCB Mounting (T2010/T2015 shown)

- 2 **T2010 & T2015:** Remove R513 (0 $\Omega$  resistor) on the logic PCB.

**3 Tx/Rx Out Function**

Connect a wire from S24 on the T2000-80 PCB to S609 on the logic PCB, as shown in Figure 8.14.1.

**4 External Channel Control (T2010 Only)**

Connect the 2 BCD lines as shown in Figure 8.14.1.

**5 Refer to Section 8.14.3, "Line Interface Options", Section 8.14.6, "Applications" and the circuit diagram before selecting the T2000-80 PCB linking options.**

Set up the T2000-80, as described in Section 8.14.4, "T2000-80 Set-Up".

**6 Carefully fold the logic and T2000-80 PCBs back in position, guiding the D-range connector through the hole provided in the T2000 chassis.**

Secure using the three logic PCB retaining screws and the three M3x8 screws provided, and refit the top cover.

Plug the D-range assembly provided in the kit into the D-range connector (S21).

**Note:** Holes are provided in the T2000 chassis for the D-range plug locking screws. Use the two black 4-40 Taptite screws provided in the kit to form the threads.

## 8.14.3 Line Interface Options

### T2000-80 Link Options

Provision has been made on the T2000-80 PCB for many different application conditions. Refer to the circuit diagram, PCB layout, the T2000 options connections table below, and the T2000-80 Signal Specifications table for details of options and links.

The PCB links are either solder shorted or fitted with 0Ω SMD resistors.

**Note:** To prevent the possibility of damage, check the Signal Specifications table before attempting to change the configuration.

The following table sets out the standard T2000-80 linking options for T2010 and T2020 models.

Link	Option
LINK1A	Rx de-emphasis
LINK2B LINK27B LINK28B	6 pole line output filter
LINK3A LINK4A	600 ohm output
LINK5	0dB line output attenuation
LINK9	Line input and output linked
LINK12B LINK13	Tx pre-emphasis
LINK16A	Mic. mute on line input PTT
LINK17A	Rx gate standard radio (T2010/T2020)
LINK18A	Opto control standard
LINK19A	Auxiliary control
LINK20A	PTT in
LINK21A	Key (0V)
LINK22B	Busy (0V)
LINK24A	Output (Tx5V/Rx0V)
LINK26B	Synth in Lock (0V)

### Additional Components

\*C60 (4μ7): This is provided to give a slight time delay to the Rx gate signal, if required.

\*C64 (1μ): This is provided to give a slight time delay to the release of transmit, if required.

\*C120 (4n7): Provision has been made on the PCB to fit an extra potted mylar capacitor for line matching, if required.

## T2000-80 Pad Connections

The following table describes the T2000-80 pad connections found on the bottom side of the T2000-80 PCB.

Pad	Signal	Description
S22	BCD1	Connect to S15 pins 9 (BCD0) and 10 (BCD1) on T2010 logic PCB for channel remote switching. Enabled in software.
S23	BCD0	
S24	TX-REG	Output indicating whether the radio is transmitting or receiving. Used for modem control applications. Tx = +5V Rx = 0V
S25	Spare	Uncommitted line to S21
S35	CGND	True ground used for RF decoupling capacitors. Must be connected to radio chassis if logic and T2000-80 PCBs are folded out during set-up and test.

## T2000 Options Connections

The following table described the signals used for line interface on P13 and P14.

Pin No.	Signal	Description
P13-1	DET-AF-OUT	Output, buffered and low pass filtered, for flat response (60% deviation, 0.25Vp-p, 1kHz).
P13-3	RX-LINE-OUT	De-emphasised and high pass filtered output (60% deviation, 0.4Vp-p, 1kHz). High pass filter circuit depends on presence of sub-audible tone signalling. Used for de-emphasised response.
P13-6	TX-LINE-IN	Input to pre-emphasis stage, bypasses compressor. Used for the pre-emphasised response (60% deviation, 0.3Vp-p, 1kHz). Line input will override microphone signal if both are present.
P13-8	TX-SIG-IN	Low gain input to T2000 limiter stage. Bypasses pre-emphasis and high pass filtering, used for the flat response (60% deviation, 2.2Vp-p, 1kHz).
P13-11	OPT-GND	Earth from the regulator section of the T2000 main PCB. Used to avoid earth loop noise.
P13-12	+13.8V-UNSW	Unswitched +13.8V supply from the T2000. Powers audio PA and external opto key circuits.
P14-1	+13.8V	Switched +13.8V supply from T2000. Powers line interface PCB +8V regulator.
P14-2	+5.0V	+5V from T2000 main PCB regulator. Powers hex inverter ICs and trunking switches.
P14-3	BUSY	Output BUSY = 0V is used to inhibit line input derived key and line input mutes. On trunked versions is used for inhibit logic.
P14-4	RX-GATE	Output port used to open the mute element in the T2000. Used to control line output mute. <b>Note:</b> Unmute = +5V for T2010 and T2020; Unmute = 0V for T2030 and T2040. This also drives the line key and opto driver indirectly.
P14-5	PTT-TO-OPT	Output mirrors PTT from microphone or signalling. PTT = 0V. On trunked versions is used for inhibit logic.
P14-6	PTT-FROM-OPT	Input port to key transmitter. Used for line input derived key and microphone derived key.
P14-7	IN-LOCK	Synthesiser phase lock detector output. Used for modem control applications. Lock = 0V.
P14-8	MIC-MUTE	Input port used to disable local microphone signal on line input derived PTT (not on microphone PTT). Mute = +5V.
P14-13	AUX	Auxiliary control output configurable in software. Used to enable/disable crossband linking, 2 wire linking etc. (see trunked versions). Aux on = +5V.
<b>Trunking Models: Additional Functions</b>		
P14-5	PTT-TP-OPT	For inhibiting modem output on PTT from microphone.
P14-10	EMERG	Performs a new function. 'External call request' = 0V input. Used for modem calls on a trunked system.
P14-11	CALL-SW	Performs a new function. 'Traffic channel allocated' = +5V output. Used for modem calls on trunked system.
P14-13	FCN/BELL/AUX	Performs a new function. 'Not clear to send' = +5V output. Used for modem calls on trunked system.

## 8.14.4 T2000-80 Set-Up

### Test Equipment Required

- AF signal generator
- distortion analyser
- frequency counter
- Modulation analyser
- High impedance voltmeter (e.g. VTVM)
- Oscilloscope
- Power meter
- Power supply (+13.8V)
- RF signal generator
- 40dB RF attenuator
- 600Ω step attenuator

The following diagram shows the test set-up.

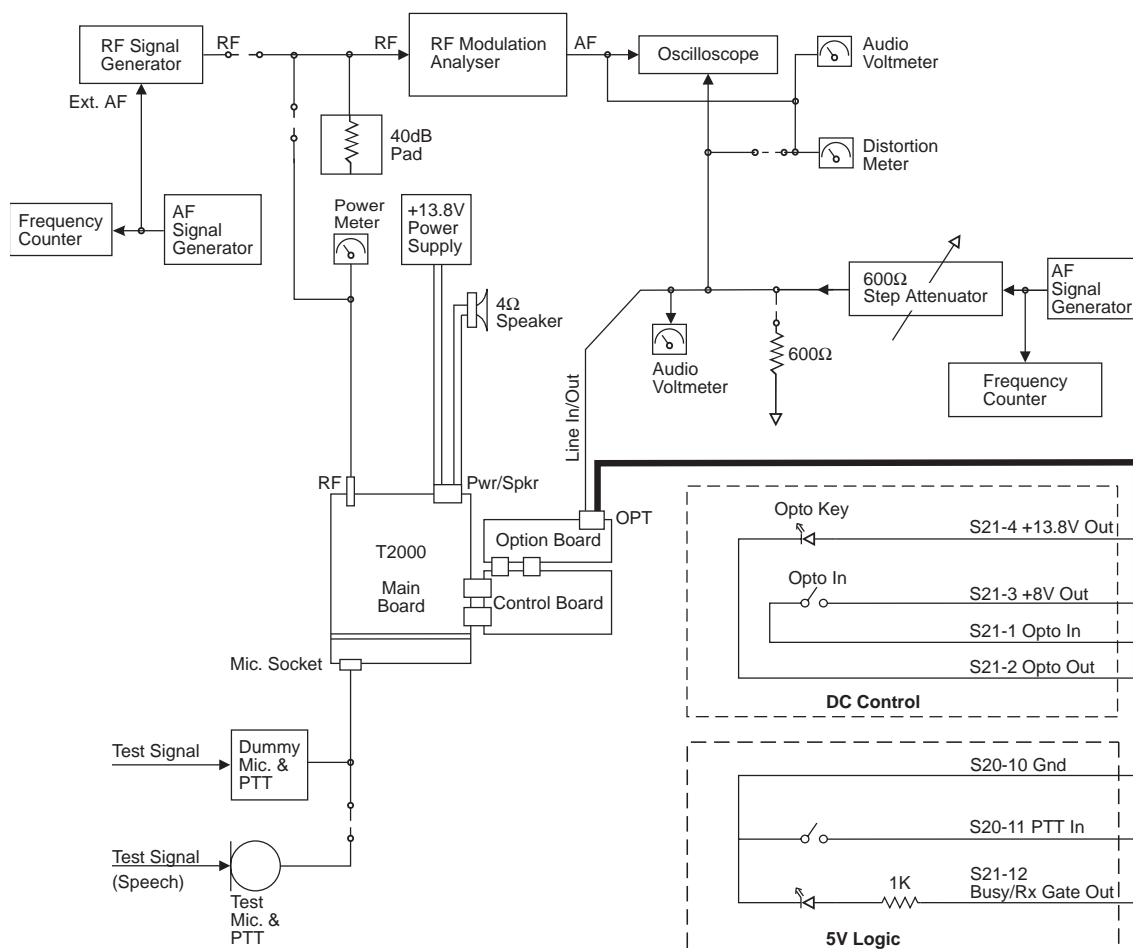






Figure 8.14.2 Test Equipment Set-Up

## Set-Up Precautions

- 1 The adjustment section assumes that the T2000 radio has been correctly aligned for normal operation. Refer to Section 8.14.3, "Line Interface Options" and the circuit diagram for linking and application details.
- 2 If the logic and T2000-80 PCBs are unscrewed and folded out for adjustment, a wire should be temporarily fitted from the radio chassis to the options chassis ground pad (S35), as shown in Figure 8.14.1.
- 3 Signals for balanced transmissions are generally less than 0dBm, and are typically between -10dBm and -20dBm.
- 4 Ensure that the **auxiliary LED**  is on (**function LED**  on trunking radios).

**Note:** Deviation settings are given first for wide band radios, followed by settings for narrow band radios in brackets [ ].

## Line Output Level

- 1 Ensure that the **auxiliary LED**  is on (**function LED**  on trunked radios).
- 2 Monitor the line output (S21 pin 5).  
Apply an on channel signal from the RF signal generator at an output level of -70dBm, modulated to  $\pm 3\text{kHz}$  [ $\pm 1.5\text{kHz}$ ] deviation, at 1kHz AF.  
Adjust the RV1 (line output control) for the required output level.

**Note:** If the line output level is to be less than -15dBm, short LINK6 (600 $\Omega$  output) and remove LINK5, to select 15dB of attenuation.

## Line Input Sensitivity

- 1 Monitor the line input (S21 pin 15).  
Ensure the **BUSY** indicator is off, and key the transmitter via the opto input (+8V).
- 2 Adjust RV2 (line input sensitivity control) until  $\pm 3\text{kHz}$  [ $\pm 1.5\text{kHz}$ ] deviation at 1kHz is achieved.

**Note:** For input signals of greater than -15dBm, set the line input attenuation for 15dB (LINK11 open).

## Time Delay Circuit

This circuit delays audio gate turn on after PTT, to prevent squelch noise bursts in repeater applications.

- 1 Enable the time delay circuit by solder shorting LINK23.
- 2 Set the required time delay using RV3 (time delay control).



## 8.14.5 Signal Specifications

The following table describes the electrical specification of T2000-80 interface signals available at the 15 way high density D-type connector (S21), mounted on the heatsink at the rear of the radio.

S21 Pin No.	Signal	Description
1	OPTO-IN	Input for external opto coupled line current detector. +8V logic.
2	OPTO-OUT	Output to drive external opto coupled line current switch. 1k ohm series resistor for LED.
3	+8V-OUT	+8V output to supply external opto coupled line current detector.
4	+13.8V-OUT	Unswitched +13.8V output to provide an unisolated keying supply.
5	LINE-OUT	Output audio path to transmission line or transformer.
6	KEYING	Bi-directional key line for use with simple two wire linking (optionally linked to OPTO-IN internally). +8V logic.
7	BCD0-OUT	Inputs used for 4 channel remote switching with the T2010. +5V logic.
8	BCD1-OUT	
9	Spare	Decoupled uncommitted line.
10	GND	Options ground. This is earth derived from the regulator section of the T2000 main PCB. Used to avoid earth loop noise.
11	PTT-IN	Keys transmitter and operates line control logic. Trunking PTT selectable. +5V logic, sense selectable by links.
12	BUSY/GATE	Busy or Rx gate output. Trunking busy link selectable. +5V logic, sense selectable by links.
13	IN-LOCK-OUT	Synthesiser lock detector output. +5V logic, sense selectable by links.
14	TX/RX-OUT	Tx regulator control output. Indicates whether the radio is in Tx or Rx. +5V logic, sense selectable by links.
15	LINE-IN	Input audio path to transmitter audio stages. Normally linked to LINE-OUT for a bi-directional line but is able to be separated for other applications using two transmission lines.
-	CGND	Provided via S21 D-range and cable screen if required for RF susceptibility.

The following diagram shows the pin designations of S21, viewed from the rear of the radio.

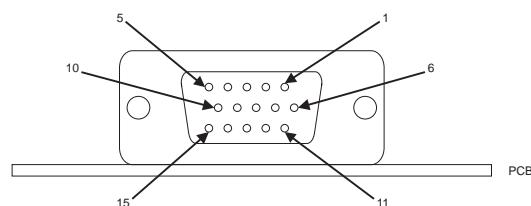


Figure 8.14.3 15 Way D-Range connector (S21)

## 8.14.6 Applications

### Filters

The frequency response of the line output low pass filter is selectable by LINK2, LINK27 and LINK28.

- 2 pole: -12dB/octave stopband attenuation,  $f > 4\text{kHz}$ .
- 6 pole: -36dB/octave stopband attenuation,  $f > 4\text{kHz}$ .

The 2 pole LPF is for applications requiring minimal group delay and stopband attenuation, e.g. standard configuration, crossband 2 wire + earth, modem connection.

The 6 pole LPF is for applications requiring external network connection where stopband attenuation is mandatory above 4kHz, e.g. crossband via external network (balanced line + opto key), remote controlled audio via external network (balanced line + opto key).

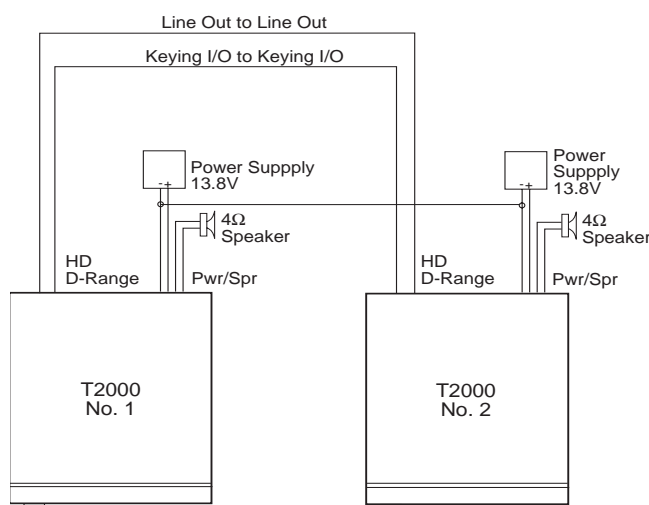
## Simple 2 Wire Linking

This is the control of 2 radios operated together, crossband or repeater linked.

- 1 Check that LINE-OUT is linked to LINE-IN internally (LINK9 fitted).

Fit LINK15 to link KEYING to OPTO-IN. This provides control in both directions. The unit generating the keying signal is already Tx inhibited.

- 2 Wire LINE-OUT (S21-5) on one T2000 to LINE-OUT (S21-5) on the other T2000. Wire KEYING (S21-6) on one T2000 to KEYING (S21-6) on the other T2000.



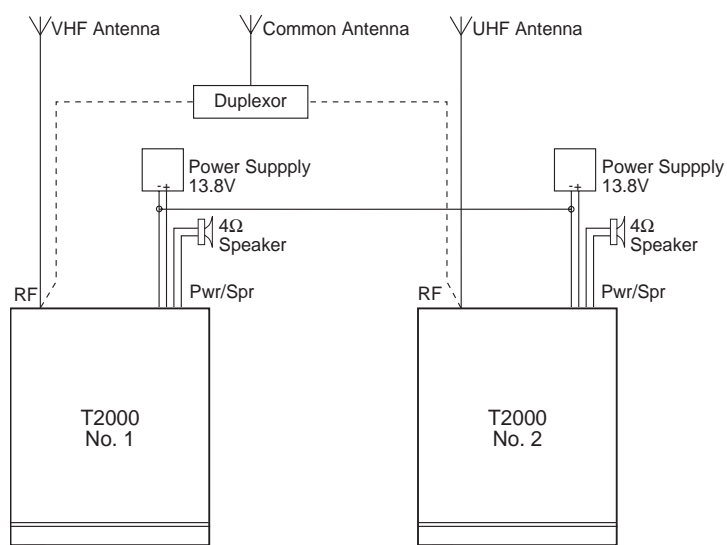
- 3 The time delay circuit may be required to eliminate squelch noise bursts for crossband operation with repeaters. LINK23 enables this circuit, which is adjustable using RV3 (refer to Section 8.14.4, "T2000-80 Set-Up").

**Note:** The 2 wire circuit assumes that the 2 radios are effectively earthed together at either the power supply or the power connector.

**Note:** A high line level is desirable to avoid earth noise i.e. 0dBm (0.775Vrms).

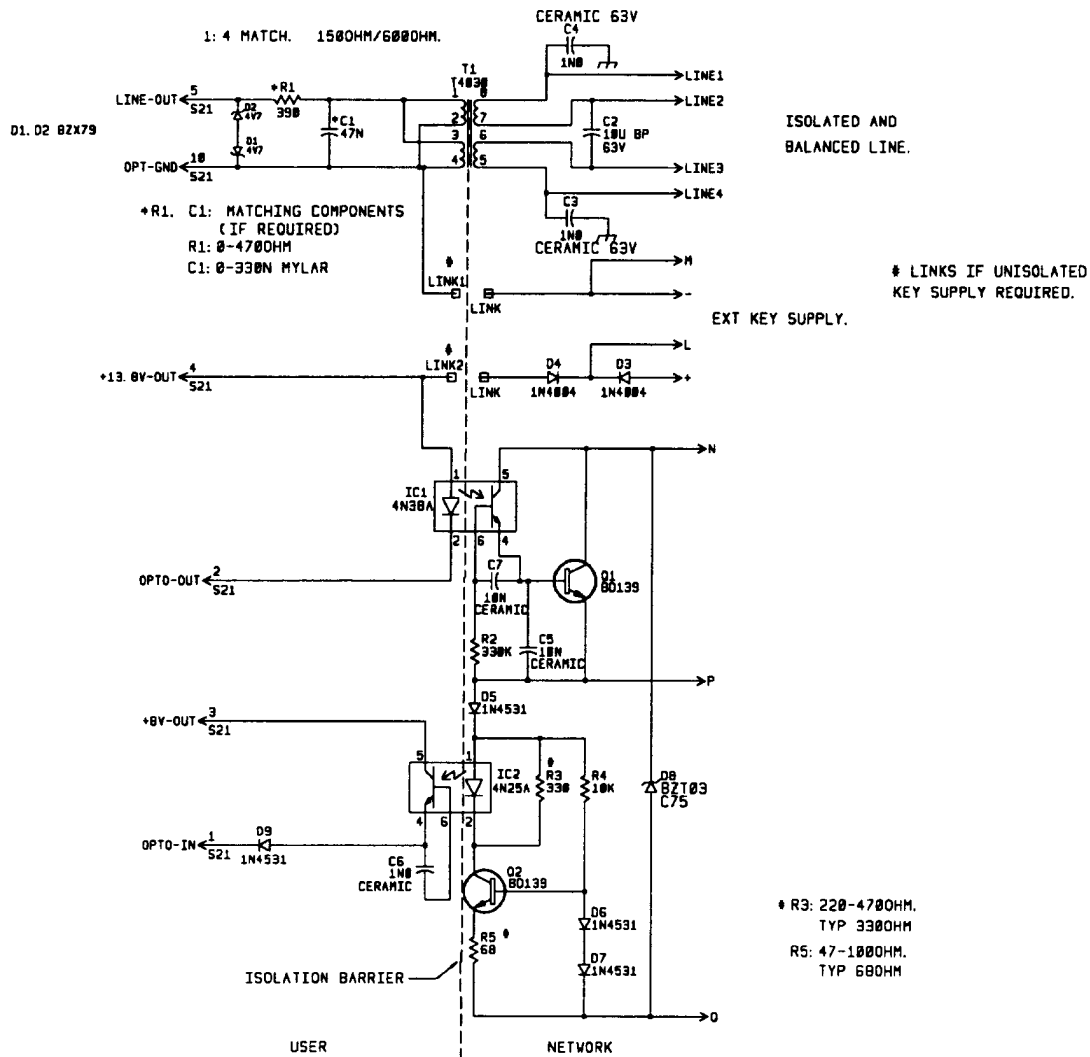
## Crossband Radios

Crossbanded radios i.e. UHF/VHF, can be achieved by using space isolated antennas to avoid de-sensing, as shown below.



Alternatively, in-band linked radios will require a duplexor to feed a common aerial.

## External Circuits For Opto Line Keying & Balanced Circuits

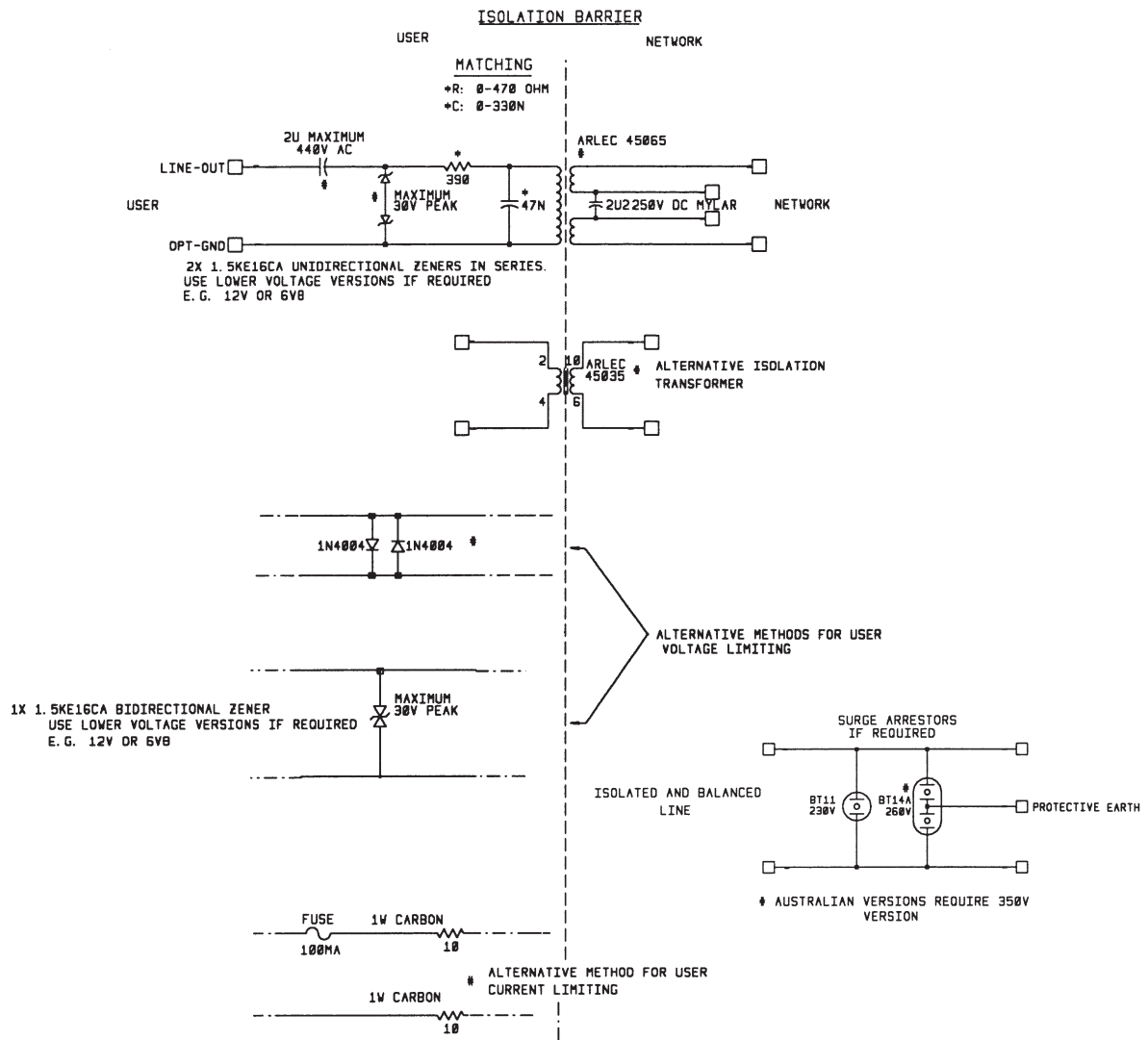


**Note:** The T4030, 4N38A and 4N25A are not intended for mains rated isolation.

- Mains rated transformer: Arlec 45035 (suitable for PSTN lines) 600/600 only, 4kVrms rated.
- HV rated transformer: Arlec 45065 (suitable for private lines) 600/600 or 600/150, 3.5kV rated.
- Transformer T4084: 2kVrms.
- Transformer T4030: no HV specification.
- Mains rated opto-isolators: CNY17G  
CNW85

Refer to the M008-50 Service Manual for line keying connection diagrams.

## Line Barrier, Private Lines

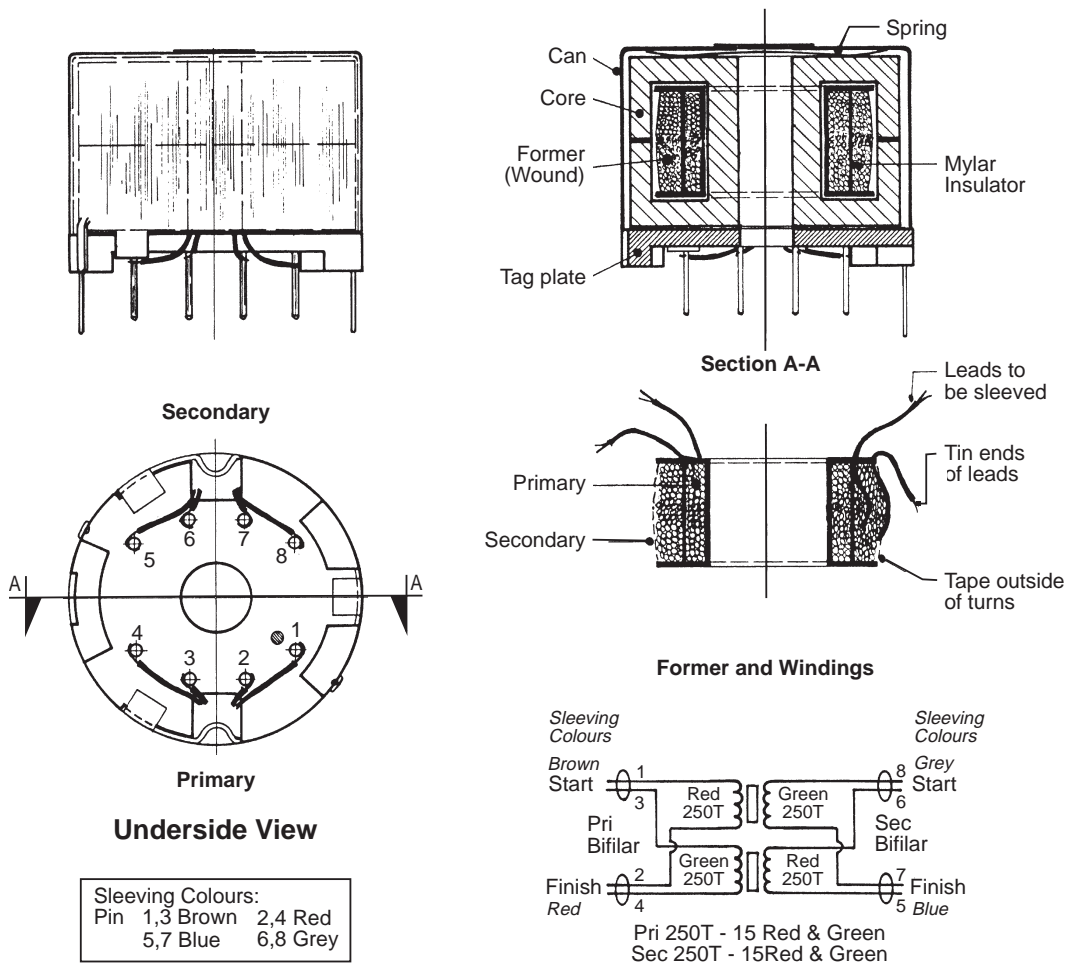


Refer to Austel Technical Standard TS 001:1991 'Safety Requirements For Customer Equipment' for other configurations.

**Note:** These circuits will require approval to the appropriate standards before use.

- Mains isolation: 4kVrms/8mm CrCl required + 2.5mm CrCl from protective earth on surge arresters.
- Private lines: 3.5kV.
- Arlec 45035: PSTN/mains rated.
- Arlec 45065: private line rated.

### T4030 Transformer Specifications:

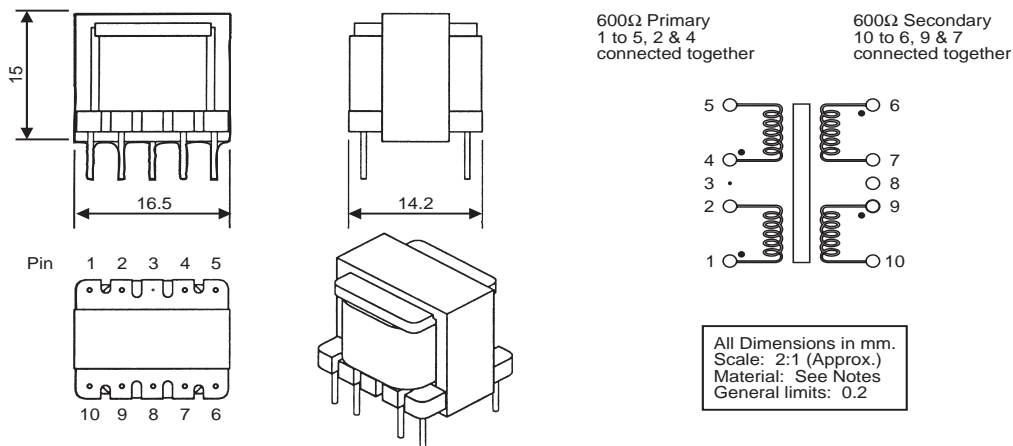


Transformer T4030 Pot Core IPN 053-01017-00

**Note:** Cores must be properly aligned when assembled.  
Core faces must be clean and free from grease and dirt.  
Ensure tag plate is firmly pressed against can before folding tabs.

Core	.. P26/16 - $\mu$ 1910
Former	.. single
Number of Turns:	
Primary	.. 250 bifilar
Secondary	.. 250 bifilar
Material	.. 15mm self flux
Tape	.. thermosetting electrical grade
Sleeving	.. inside diameter all colours, 0.5mm
Inductance 1	.. $6 \pm 1.5H$
(total series inductance, pin 1 to 5 - connect pins 2 & 3, 4 & 8 and 7 & 6)	
Inductance 2	.. $1.5 \pm 0.4H$
(any winding, with all others open circuit)	

## T4084 Transformer Specifications:



**Transformer T4084 IPN 053-01067-00**

Impedance	.. 600Ω /600Ω centre tapped, separated
Output Level	.. 0dBm at 1kHz
Frequency Response	.. +0.2dB, -0.5dB 300Hz to 3400Hz relative to 1kHz at 0dBm output
Insertion Loss	.. <0.75dB, 0dBm output at 1kHz
Return Loss (relative to 600Ω):	
At 1kHz	.. >15dB
At 300Hz	.. >10dB
Distortion (unbalanced current):	
1kHz 0dBm out 0mA DC	.. <0.2%
1kHz 0dBm out 5mA DC	.. <0.7%
300Hz 0dBm out 0mA DC	.. <1.0%
300Hz 0dBm out 5mA DC	.. <6.0%
Level reduction due to 5mA DC at 300Hz	.. <2dB
Impedance Balance About Earth	.. >46dB over 50Hz to 3400Hz
Insulation:	
DC Primary to Secondary	.. 500V R>10MΩ
Primary & Secondary to core	.. 500V R>10MΩ
A.C.Primary to Secondary	.. 2kVrms 60sec.
Primary & Secondary to core	.. 2kVrms 60sec.
Ferrite Core	.. see 16 x 7 10 Pin Bobbin Harvard Inds. Ref. Cerf. 2611
Primary Inductance (1kHz 1 to 5, 2 & 4 connected together)	.. 500mH ±50mH typical
Leakage Inductance (10kHz; 1 to 5, 2 & 4 connected together, 6, 7, 9, & 10 connected together)	.. 700μH ±100μH typical
Primary DC Resistance:	
1-2	.. 8.3Ω typical
4-5	.. 8.3Ω typical
Secondary DC Resistance:	
10-9	.. 14.6Ω typical
7-6	.. 14.6Ω typical

## 8.14.7 Specifications

### T2000-80

Input Voltage (from S13 & S14 on the T2000 logic PCB)	.. 10.8V to 16V DC
Operating Temperature Range	.. -10°C to +60°C ambient
DC Input Current	.. < 40mA total (+13.8V supply)
Line Input Sensitivity (60% deviation)	.. -20dBm to +6dBm (600Ω)
Line Output Level (60% deviation)	.. -20dBm to +6dBm (600Ω)
Line Impedance	.. 600 or 150Ω
Return Loss (300Hz to 3kHz).	.. > 20dB relative to 600 or 150Ω
Line Output Filter Response (stopband):	
2 pole	.. -12dB/octave, f > 4kHz
6 pole	.. -36dB/octave, f > 4kHz

### T2000 + T2000-80 Line Interface

#### a Receiver + Line Output

Receiver Frequency Response (relative to 1kHz, 60% deviation):

Receiver Processed:

Bandwidth	.. 300Hz to 3kHz (standard) 400Hz to 3kHz (CTCSS)
Response	.. +1, -3dB relative to -6dB/octave
Receiver Unprocessed	.. +1, -3dB (300Hz to 3kHz)

Test signal .. -70dBm RF, 60% deviation at 1kHz,  
0dBm line output.

Signal-to-Noise Ratio:

Narrow Band	.. > 39dB
Wide Band	.. > 45dB

Mute Ratio .. > 65dB

Distortion (30kHz band width distortion meter):

Wide Band De-emphasised	.. < 2%
Narrow Band De-emphasised	.. < 3%
Wide Band Flat	.. < 4%
Narrow Band Flat	.. < 6%



**b Transmitter + Line Input**

Transmitter Frequency response:

Transmitter Processed:

(relative to 1kHz, 20% deviation, below limiting)

Bandwidth .. 300Hz to 2.55kHz (narrow band)  
300Hz to 3kHz (wide band)

Response .. +1, -3dB relative to +6dB/octave

Transmitter Unprocessed (relative to 1kHz, 60% deviation):

Bandwidth .. 300Hz to 2.55kHz (narrow band)  
300Hz to 3kHz (wide band)

Response .. +1, -3dB

Test signal .. 0dBm line input, 1kHz, 60% deviation

Signal-to-Noise Ratio:

(demodulated, filtered 300Hz to 3kHz + de-emphasised 750 $\mu$ s rms)

Narrow Band .. &gt; 39dB

Wide Band .. &gt; 45dB

Distortion .. &lt; 2%

(demodulated, filtered 15kHz low pass)

## 8.14.8 Circuit Description

Refer to Figure 8.14.4, Figure 8.14.4 and the circuit diagram.

### Line Output Path

Flat or de-emphasised audio from the receiver is selected by links to DET-AF-OUT or RX- LINE-OUT. Receiver audio passes through a mute element to a buffer amplifier, and then to three stages of low pass filtering. Two responses are selectable by links: 2 pole or 6 pole roll-off beyond 4kHz.

The filtered signal passes to a second mute element and level control before passing to the line output drive amplifier. Line output impedance and attenuation are selectable by links. Line output can be linked to line input for a shared line in, line out.

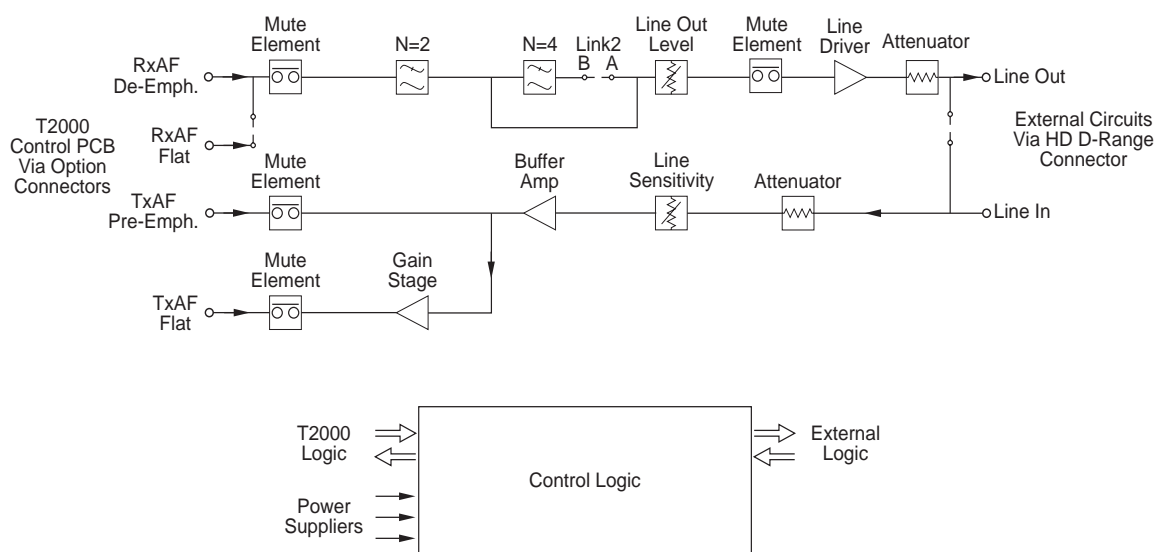


Figure 8.14.4 T2000-80 Line Interface PCB Block Diagram

### Line Input Path

The line input has terminations for two line impedances which are link selectable. The line input level can be attenuated, if required, before passing to the line sensitivity control. Protection diodes are fitted to prevent the following amplifier stage from being overdriven.

The amplifier provides gain and buffers the signal, which is split into two paths for either pre-emphasis or flat response. The pre-emphasis path is via a mute element and options linking. This signal drives TX-LINE-IN, which will override the microphone signal. Normally, the microphone is muted on line derived PTT.

The flat response path is amplified and then passes to a mute element which drives TX-SIG-IN. This input requires a high signal level, due to the high input impedance. The amplifier is disabled by links, when not used, to prevent the possibility of crosstalk and leakage to other circuitry.

## Control Logic

For standard mobiles in normal operation, the audio mute elements, transmit inhibit and opto driver are all inhibited by the auxiliary control. The radio can be used normally with 'auxiliary off', and line controlled with 'auxiliary on'.

With 'auxiliary on', the line output mute elements and opto driver are controlled from the RX-GATE. A signal on the BUSY line inhibits the transmitter line key circuitry. Line derived key signals, such as OPTO-IN, KEYING and PTT-IN, can be used to key the radio, provided the auxiliary control is on and the radio is not busy.

The KEYING line is used for back-to-back control of two radios, each with a line interface PCB. This enables crossband linking to be achieved with a minimum of external circuitry. In this case, the KEYING line can be linked to the OPTO-IN line on each unit, with a wire between the two OPTO-IN lines providing bi-directional control. KEYING is controlled by the receive gate and is used to drive the opto input of another line interface PCB.

The opto input is intended to be connected to the output of an optocoupler circuit (BJT) used for loop and tail keying via transmission lines (refer to Section 8.14.6, "Applications").

The opto output is intended to be connected to the input of an optocoupler circuit (LED) used for loop and tail keying via transmission lines (refer to Section 8.14.6, "Applications"). The sense of this circuit can be changed by a link.

An adjustable time delay circuit is available to prevent transmitter cycling when crossband connected radios are both operating on repeater channels. The circuit is adjustable to approximately 1.5 seconds, with the time delay control fully clockwise, and can be disabled completely by removing a link.

PTT-IN can be used to key the transmitter. Links are available to enable either logic sense. For trunked versions using modems, a circuit is provided to set up a call automatically.

Control logic for telemetry and modems is provided so that the radio can be operated automatically. IN-LOCK-OUT, BUSY/GATE and TX/RX-OUT outputs can be set by links for either logic sense.

Trunked modems operate in a different manner, and first have to set up a call to obtain a traffic channel allocation.

Logic is available which requires several link changes, as some of the radio options connections perform different functions:

Standard	Trunked
AUX on/off	not clear to send
emergency	external call request
call	traffic channel allocated

## Power Supplies

+5V is provided from the main regulator via the options connector. +8V is provided by a TO-92 3 terminal regulator. This is also available on the T2000-80 PCB D-range connector, for powering an optocoupler transistor used for line key current detection. The +13.8V input of the regulator is derived from the options connector. The +3.2V rail provides bias to the audio stages and is derived from the +8V regulator. The unswitched +13.8V from the options connector powers the line drive amplifier, and is available on the T2000-80 D-range for use as an unisolated line key supply option.

## 8.14.9 PCB Information

### T2000-80 Parts List (IPN 220-01272-02)

Ref	IPN	Description	Ref	IPN	Description
C6	015-23220-01	CAP CER 0805 CHIP 220P 5% NPO 50V	IC1	002-10040-53	(S) IC 4053 SMD TRIPLE 2CH MULTI-PLEXR
C9	015-23220-01	CAP CER 0805 CHIP 220P 5% NPO 50V	IC2	002-10003-58	(S) IC SMD LM358 DUAL OP AMP
C18	022-55100-10	CAP MYLAR AI 10N 5% 63V POTTED	IC3	002-10003-58	(S) IC SMD LM358 DUAL OP AMP
C45	015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V	IC4	002-10040-53	(S) IC 4053 SMD TRIPLE 2CH MULTI-PLEXR
C46	015-23470-08	CAP CER 0805 CHIP 470P 10% X7R 50V	IC5	002-10003-58	(S) IC SMD LM358 DUAL OP AMP
C47	022-54330-10	CAP MYLAR AI 3N3 5% 63V POTTED	IC6	002-10040-69	(S) IC 4069 SMD CMOS HEX INVERTERS
C48	015-23220-01	CAP CER 0805 CHIP 220P 5% NPO 50V	IC7	002-10040-69	(S) IC 4069 SMD CMOS HEX INVERTERS
C49	015-23220-01	CAP CER 0805 CHIP 220P 5% NPO 50V	IC13	002-00014-60	(S) IC 78L08A 8V 100MA REG TO-92
C50	015-23180-01	CAP CER 0805 CHIP 180P 5% NPO 50V	IC14	002-00014-05	(S) IC TDA7231 1.6W AF PWR
C51	015-23100-01	CAP CER 0805 CHIP 100P 5% NPO 50V	LINK1	036-10000-00	RES M/F 0805 CHIP ZERO OHM
C52	022-54470-10	CAP MYLAR AI 4N7 5% 63V POTTED	L1	056-00021-02	IND FXD 100UH AXIAL
C53	015-23180-01	CAP CER 0805 CHIP 180P 5% NPO 50V	LINK2	036-10000-00	RES M/F 0805 CHIP ZERO OHM
C54	015-22220-01	CAP CER 0805 CHIP 22P 5% NPO 50V	LINK3	036-10000-00	RES M/F 0805 CHIP ZERO OHM
C55	022-55100-10	CAP MYLAR AI 10N 5% 63V POTTED	LINK4	036-10000-00	RES M/F 0805 CHIP ZERO OHM
C56	020-54740-10	CAP ELECT AI RDL 4U7 50V LO ESR	LINK5	036-10000-00	RES M/F 0805 CHIP ZERO OHM
C57	015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V	LINK6	036-10000-00	RES M/F 0805 CHIP ZERO OHM
C58	015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V	LINK7	036-10000-00	RES M/F 0805 CHIP ZERO OHM
C59	015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V	LINK8	036-10000-00	RES M/F 0805 CHIP ZERO OHM
C61	020-57100-55	CAP ELECT AI RDL 1UF 50V 4X7MM	LINK9	036-10000-00	RES M/F 0805 CHIP ZERO OHM
C62	015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V	LINK10	036-10000-00	RES M/F 0805 CHIP ZERO OHM
C63	015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V	LINK11	036-10000-00	RES M/F 0805 CHIP ZERO OHM
C65	015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V	LINK12	036-10000-00	RES M/F 0805 CHIP ZERO OHM
C66	015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V	LINK13	036-10000-00	RES M/F 0805 CHIP ZERO OHM
C67	015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V	LINK14	036-10000-00	RES M/F 0805 CHIP ZERO OHM
C68	015-25100-08	CAP CER 0805 CHIP 10N 10% X7R 50V	LINK15	036-10000-00	RES M/F 0805 CHIP ZERO OHM
C69	015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V	LINK16	036-10000-00	RES M/F 0805 CHIP ZERO OHM
C70	015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V	LINK17	036-10000-00	RES M/F 0805 CHIP ZERO OHM
C71	015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V	LINK18	036-10000-00	RES M/F 0805 CHIP ZERO OHM
C72	015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V	LINK19	036-10000-00	RES M/F 0805 CHIP ZERO OHM
C73	015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V	LINK20	036-10000-00	RES M/F 0805 CHIP ZERO OHM
C74	015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V	LINK21	036-10000-00	RES M/F 0805 CHIP ZERO OHM
C75	015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V	LINK22	036-10000-00	RES M/F 0805 CHIP ZERO OHM
C76	015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V	LINK23	036-10000-00	RES M/F 0805 CHIP ZERO OHM
C77	020-59100-13	CAP ELECT AI RDL 100UF 16V 7X7MM MICRO	LINK24	036-10000-00	RES M/F 0805 CHIP ZERO OHM
C78	020-59100-13	CAP ELECT AI RDL 100UF 16V 7X7MM MICRO	LINK25	036-10000-00	RES M/F 0805 CHIP ZERO OHM
C79	015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V	LINK26	036-10000-00	RES M/F 0805 CHIP ZERO OHM
C80	020-59100-13	CAP ELECT AI RDL 100UF 16V 7X7MM MICRO	LINK27	036-10000-00	RES M/F 0805 CHIP ZERO OHM
C81	015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V	LINK28	036-10000-00	RES M/F 0805 CHIP ZERO OHM
C82	015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V	P13	240-00026-26	CONN PADLE BRD 12 WAY MICRO MATCH 1-215
C83	020-59100-13	CAP ELECT AI RDL 100UF 16V 7X7MM MICRO	P14	240-00020-54	PLUG 16 WAY 2X8 FLAT CABLE TERMN MICROM
C84	020-59100-13	CAP ELECT AI RDL 100UF 16V 7X7MM MICRO	P15	240-00020-51	PLUG 12 WAY 2*6 FLAT CABLE TERMN
C85	015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V	Q1	000-10008-48	(S) XSTR SMD BCW60/BC848B215 NPN SOT23 A
C86	015-23150-01	CAP CER 0805 CHIP 150P 5% NPO 50V	Q2	000-10008-48	(S) XSTR SMD BCW60/BC848B215 NPN SOT23 A
C87	015-23150-01	CAP CER 0805 CHIP 150P 5% NPO 50V	Q3	000-10008-48	(S) XSTR SMD BCW60/BC848B215 NPN SOT23 A
C88	015-23150-01	CAP CER 0805 CHIP 150P 5% NPO 50V	Q4	000-10008-48	(S) XSTR SMD BCW60/BC848B215 NPN SOT23 A
C89	020-59100-13	CAP ELECT AI RDL 100UF 16V 7X7MM MICRO	Q5	000-10008-48	(S) XSTR SMD BCW60/BC848B215 NPN SOT23 A
C90	020-59100-13	CAP ELECT AI RDL 100UF 16V 7X7MM MICRO	Q6	000-10008-48	(S) XSTR SMD BCW60/BC848B215 NPN SOT23 A
C91	015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V	Q7	000-10008-48	(S) XSTR SMD BCW60/BC848B215 NPN SOT23 A
C92	015-22470-01	CAP CER 0805 CHIP 47P 5% NPO 50V	Q8	000-10008-48	(S) XSTR SMD BCW60/BC848B215 NPN SOT23 A
C93	015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V	Q9	000-10008-48	(S) XSTR SMD BCW60/BC848B215 NPN SOT23 A
C94	015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V	Q10	000-10008-48	(S) XSTR SMD BCW60/BC848B215 NPN SOT23 A
C95	015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V	Q11	000-10008-48	(S) XSTR SMD BCW60/BC848B215 NPN SOT23 A
C96	015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V	Q12	000-10008-48	(S) XSTR SMD BCW60/BC848B215 NPN SOT23 A
C97	015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V	Q13	000-10008-57	(S) XSTR SMD BCW70/BC857-215 PNP SOT23 AF
C98	015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V	RV1	042-04470-07	RES PRESET 4K7 CARBON 6MM FLAT DUAL ADJ
C99	015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V	RV2	042-04470-07	RES PRESET 4K7 CARBON 6MM FLAT DUAL ADJ
C100	015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V	RV3	042-05470-07	RES PRESET 47K CARBON 6MM FLAT DUAL ADJ
C101	015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V	R50	036-15100-00	RES M/F 0805 CHIP 10K 5%
C102	015-22470-01	CAP CER 0805 CHIP 47P 5% NPO 50V	R51	036-15330-00	RES M/F 0805 CHIP 33K 5%
C103	015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V	R52	036-15330-00	RES M/F 0805 CHIP 33K 5%
C104	015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V	R53	036-15100-00	RES M/F 0805 CHIP 10K 5%
C105	022-54220-10	CAP MYLAR AI 2N2 5% 63V POTTED	R54	036-15330-00	RES M/F 0805 CHIP 33K 5%
C106	020-58100-04	CAP ELECT AI RDL 10M 16V 4X7MM	R55	036-15330-00	RES M/F 0805 CHIP 33K 5%
C107	015-22470-01	CAP CER 0805 CHIP 47P 5% NPO 50V	R56	036-14100-00	RES M/F 0805 CHIP 1K 5%
C108	015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V	R57	036-15100-00	RES M/F 0805 CHIP 10K 5%
C109	015-06100-08	CAP CER 1206 CHIP 100N 10% X7R 50V	R58	036-15220-00	RES M/F 0805 CHIP 22K 5%
C110	015-24100-08	CAP CER 0805 CHIP 1N 10% X7R 50V	R59	036-15220-00	RES M/F 0805 CHIP 22K 5%
D1	001-10000-56	(S) DIODE SMD BAW56 DUAL SWITCH SOT-23 C	R60	036-14100-00	RES M/F 0805 CHIP 1K 5%
D2	001-10000-99	(S) DIODE SMD BAV99 DUAL SWTCH SNGLE INLI	R61	036-14100-00	RES M/F 0805 CHIP 1K 5%
D3	001-10000-56	(S) DIODE SMD BAW56 DUAL SWITCH SOT-23 C	R62	036-17100-00	RES M/F 0805 CHIP 1M 5%
D5	001-10000-70	(S) DIODE SMD BAV70 DUAL SWITCH SOT-23 CO	R63	036-15470-00	RES M/F 0805 CHIP 47K 5%
D7	001-10000-56	(S) DIODE SMD BAW56 DUAL SWITCH SOT-23 C	R64	036-12100-00	RES M/F 0805 CHIP 10E 5%
D8	001-10000-56	(S) DIODE SMD BAW56 DUAL SWITCH SOT-23 C			
D9	001-10000-56	(S) DIODE SMD BAW56 DUAL SWITCH SOT-23 C			

Ref	IPN	Description	Ref	IPN	Description
R65	036-17100-00	RES M/F 0805 CHIP 1M 5%	R145	036-15470-00	RES M/F 0805 CHIP 47K 5%
R66	036-17100-00	RES M/F 0805 CHIP 1M 5%	R146	036-14100-00	RES M/F 0805 CHIP 1K 5%
R67	036-15100-00	RES M/F 0805 CHIP 10K 5%	R147	036-16100-00	RES M/F 0805 CHIP 100K 5%
R68	036-16150-00	RES M/F 0805 CHIP 150K 5%	R148	036-15100-00	RES M/F 0805 CHIP 10K 5%
R69	036-15220-00	RES M/F 0805 CHIP 22K 5%	R149	036-16100-00	RES M/F 0805 CHIP 100K 5%
R70	036-14270-00	RES M/F 0805 CHIP 2K7 5%	R150	036-16100-00	RES M/F 0805 CHIP 100K 5%
R71	036-17100-00	RES M/F 0805 CHIP 1M 5%	R151	036-17100-00	RES M/F 0805 CHIP 1M 5%
R72	036-15100-00	RES M/F 0805 CHIP 10K 5%	R152	036-15100-00	RES M/F 0805 CHIP 10K 5%
R73	036-15100-00	RES M/F 0805 CHIP 10K 5%	R153	036-15100-00	RES M/F 0805 CHIP 10K 5%
R74	036-15470-00	RES M/F 0805 CHIP 47K 5%	R154	036-15100-00	RES M/F 0805 CHIP 10K 5%
R75	036-14220-00	RES M/F 0805 CHIP 2K2 5%	R155	036-14270-00	RES M/F 0805 CHIP 2K7 5%
R76	036-16150-00	RES M/F 0805 CHIP 150K 5%	R156	036-12100-00	RES M/F 0805 CHIP 10E 5%
R77	036-14470-00	RES M/F 0805 CHIP 4K7 5%	R157	036-17100-00	RES M/F 0805 CHIP 1M 5%
R78	036-17100-00	RES M/F 0805 CHIP 1M 5%			
R79	036-14270-00	RES M/F 0805 CHIP 2K7 5%	S21	240-00010-58	SKT 15WAY D-RANGE HI-DENSITY RGT AG PCB
R80	036-15100-00	RES M/F 0805 CHIP 10K 5%			
R81	036-13100-00	RES M/F 0805 CHIP 100E 5%			
R82	036-13100-00	RES M/F 0805 CHIP 100E 5%			
R83	036-14100-00	RES M/F 0805 CHIP 1K 5%			
R84	036-17100-00	RES M/F 0805 CHIP 1M 5%			
R85	036-17100-00	RES M/F 0805 CHIP 1M 5%			
R86	036-12100-00	RES M/F 0805 CHIP 10E 5%			
R87	036-13100-00	RES M/F 0805 CHIP 100E 5%			
R88	036-13100-00	RES M/F 0805 CHIP 100E 5%			
R89	036-15100-00	RES M/F 0805 CHIP 10K 5%			
R90	036-12100-00	RES M/F 0805 CHIP 10E 5%			
R91	036-12100-00	RES M/F 0805 CHIP 10E 5%			
R92	036-14270-00	RES M/F 0805 CHIP 2K7 5%			
R93	036-17100-00	RES M/F 0805 CHIP 1M 5%			
R94	036-13100-00	RES M/F 0805 CHIP 100E 5%			
R95	036-13100-00	RES M/F 0805 CHIP 100E 5%			
R96	036-17100-00	RES M/F 0805 CHIP 1M 5%			
R97	036-14100-00	RES M/F 0805 CHIP 1K 5%			
R98	036-13100-00	RES M/F 0805 CHIP 100E 5%			
R99	036-13100-00	RES M/F 0805 CHIP 100E 5%			
R100	036-12100-00	RES M/F 0805 CHIP 10E 5%			
R101	036-15120-00	RES M/F 0805 CHIP 12K 5%			
R102	036-14820-00	RES M/F 0805 CHIP 8K2 5%			
R103	036-12100-00	RES M/F 0805 CHIP 10E 5%			
R104	036-12100-00	RES M/F 0805 CHIP 10E 5%			
R105	036-15100-00	RES M/F 0805 CHIP 10K 5%			
R106	036-15470-00	RES M/F 0805 CHIP 47K 5%			
R107	036-13560-00	RES M/F 0805 CHIP 560E 5%			
R108	036-13150-00	RES M/F 0805 CHIP 150E 5%			
R109	036-11470-00	RES M/F 0805 CHIP 4E7 10%			
R110	036-14220-00	RES M/F 0805 CHIP 2K2 5%			
R111	036-13220-00	RES M/F 0805 CHIP 220E 5%			
R107	036-13560-00	RES M/F 0805 CHIP 560E 5%			
R108	036-13150-00	RES M/F 0805 CHIP 150E 5%			
R109	036-11470-00	RES M/F 0805 CHIP 4E7 10%			
R110	036-14220-00	RES M/F 0805 CHIP 2K2 5%			
R111	036-13220-00	RES M/F 0805 CHIP 220E 5%			
R112	036-13390-00	RES M/F 0805 CHIP 390E 5%			
R113	036-13390-00	RES M/F 0805 CHIP 390E 5%			
R114	036-13560-00	RES M/F 0805 CHIP 560E 5%			
R115	036-13150-00	RES M/F 0805 CHIP 150E 5%			
R116	036-13100-00	RES M/F 0805 CHIP 100E 5%			
R117	036-13100-00	RES M/F 0805 CHIP 100E 5%			
R118	036-12560-00	RES M/F 0805 CHIP 56E 5%			
R119	036-15100-00	RES M/F 0805 CHIP 10K 5%			
R120	036-15100-00	RES M/F 0805 CHIP 10K 5%			
R121	036-17100-00	RES M/F 0805 CHIP 1M 5%			
R122	036-15100-00	RES M/F 0805 CHIP 10K 5%			
R123	036-16100-00	RES M/F 0805 CHIP 100K 5%			
R124	036-15120-00	RES M/F 0805 CHIP 12K 5%			
R125	036-15120-00	RES M/F 0805 CHIP 12K 5%			
R126	036-13100-00	RES M/F 0805 CHIP 100E 5%			
R127	036-13100-00	RES M/F 0805 CHIP 100E 5%			
R128	036-13100-00	RES M/F 0805 CHIP 100E 5%			
R129	036-13100-00	RES M/F 0805 CHIP 100E 5%			
R130	036-13100-00	RES M/F 0805 CHIP 100E 5%			
R131	036-17100-00	RES M/F 0805 CHIP 1M 5%			
R132	036-14220-00	RES M/F 0805 CHIP 2K2 5%			
R133	036-16150-00	RES M/F 0805 CHIP 150K 5%			
R134	036-16150-00	RES M/F 0805 CHIP 150K 5%			
R135	036-14100-00	RES M/F 0805 CHIP 1K 5%			
R136	036-15220-00	RES M/F 0805 CHIP 22K 5%			
R137	036-14220-00	RES M/F 0805 CHIP 2K2 5%			
R138	036-15470-00	RES M/F 0805 CHIP 47K 5%			
R139	036-14270-00	RES M/F 0805 CHIP 2K7 5%			
R140	036-15220-00	RES M/F 0805 CHIP 22K 5%			
R141	036-15100-00	RES M/F 0805 CHIP 10K 5%			
R142	036-15100-00	RES M/F 0805 CHIP 10K 5%			
R143	036-14270-00	RES M/F 0805 CHIP 2K7 5%			
R144	036-15100-00	RES M/F 0805 CHIP 10K 5%			

## Mechanical & Miscellaneous Parts

020-57470-10	CAP ELECT AI RDL 4U7 50V LO ESR (*C60)
020-57100-55	CAP ELECT AI RDL 1UF 50V 4X7MM (*C64)
205-00010-12	CABLE FLAT RBBN 16 CORE 16/70.1 GREY (2 X 25MM)
220-01272-02	PCB T2000 LINE INTERFACE UNIT
240-00010-80	PLUG 15 WAY DRANGE HI-DENS SUBMIN SOLD
240-00026-24	CONN PADLE BRD 16 WAY MICRO MATCH 1-215
240-06010-28	HOOD/COVER 9WAY DRANGE COMPACT NO LO
240-06010-29	HOOD/COVER 9WAY DRANGE LONG EAR THUM
349-00020-06	SCREW TAPTITE 4-40X1/4 PAN POZI BL (TO TAP CHASSIS HOLES)
49-00020-32	SCREW TAPTITE M3X8MM PAN POZI BZ
365-00011-54	LABEL WHITE RW1556/2 SPECIAL ADHESIVE
365-00100-20	LABEL WHITE S/A 28X11MM QUIKSTIK RW718/4
399-00010-51	BAG PLASTIC 75*100MM
399-00010-86	BAG STATIC SHIELDING 127X203MM
410-00010-60	CARTON 150X112X56MM VICTOR
418-20080-01	FITTING INS T2000-80 LINE INTERFACE KIT

## T2000-80 Grid Reference Index (IPN 220-01272-02)

Device	PCB	Circuit	Device	PCB	Circuit	Device	PCB	Circuit	Device	PCB	Circuit
C6	2:C3	1-H8				P14	1:E1	1-B8	R107	2:J2	1-P7
C9	2:C2	1-H9	D9	1:C3	1-H3			1-B8	R108	2:J3	1-P7
C18	1:D3	1-L9			1-H3			1-B0	R109	2:G3	1-Q8
C45	1:B2	1-D7	IC1	1:B2	1-M0			1-B0	R110	2:G3	1-R8
C46	2:C3	1-H8			1-E8			1-B4	R111	2:H3	1-S8
C47	1:C3	1-H9			1-E5			1-B4	R112	2:H3	1-S8
C48	2:C2	1-J8			1-E7			1-B2	R113	2:H3	1-S8
C49	2:D2	1-J8	IC2	1:C2	1-K0			1-B3	R114	2:H3	1-R8
C50	2:D2	1-J8			1-H8			1-N0	R115	2:H3	1-R8
C51	2:C3	1-J8			1-G8	Q1	1:G3	1-H1	R116	2:H3	1-S8
C52	1:C3	1-J9	IC3	1:D2	1-L0	Q2	1:F3	1-E1	R117	2:H3	1-S8
C53	1:D2	1-L8			1-L8	Q3	1:G3	1-H2	R118	2:H3	1-S8
C54	1:D2	1-L8			1-J8	Q4	1:K1	1-D0	R119	2:D3	1-K8
C55	1:D3	1-L8	IC4	1:J2	1-N0	Q5	1:D3	1-E0	R120	1:G3	1-G2
C56	1:E2	1-N8			1-R3	Q6	1:D4	1-I3	R121	2:J1	1-C2
C57	1:B2	1-E8			1-Q3	Q7	1:D3	1-J3	R122	1:J3	1-F6
C58	1:E3	1-O8			1-Q2	Q8	1:E3	1-O8	R123	1:J3	1-G7
C59	2:J3	1-U8	IC5	1:H3	1-K0	Q9	1:E3	1-H0	R124	1:J3	1-G6
*C60	1:G3	1-G1			1-G7	Q10	1:L2	1-S1	R125	1:H3	1-G6
C61	1:C3	1-H3			1-I6	Q11	1:C4	1-H1	R126	1:M3	1-U9
C62	1:K2	1-U2	IC6	1:K2	1-F3	Q12	1:G2	1-N3	R127	1:M3	1-U9
C63	2:B3	1-D6			1-G3	Q13	1:G2	1-N3	R128	1:K3	1-V3
*C64	1:H2	1-L2			1-O0	RV1	1:E3	1-O8	R129	2:J2	1-U3
C65	2:J3	1-U7			1-F3	RV2	1:H2	1-L7	R130	1:K3	1-V1
C66	1:J3	1-U3			1-G3	RV3	1:E2	1-G0	R131	2:E2	1-H0
C67	1:K2	1-U2			1-L4	R50	2:G2	1-N3	R132	2:E3	1-D1
C68	2:E2	1-N8			1-M4	R51	1:C2	1-G8	R133	1:H4	1-I6
C69	1:K3	1-U1	IC7	1:L2	1-P0	R52	1:C2	1-H8	R134	1:H3	1-I7
C70	2:J3	1-U6			1-C0	R53	2:B3	1-I8	R135	1:H3	1-K7
C71	1:K3	1-U1			1-C0	R54	2:C2	1-I8	R136	2:H2	1-L7
C72	1:E3	1-N8			1-P3	R55	2:C2	1-J8	R137	1:H4	1-H6
C73	1:L3	1-U4			1-M5	R56	2:E2	1-M8	R138	1:H4	1-I6
C74	1:L3	1-U5			1-L5	R57	1:D3	1-M8	R139	1:K1	1-D0
C75	2:A2	1-Q0			1-C3	R58	2:C2	1-K8	R140	1:D3	1-G0
C76	2:A4	1-R0	IC13	1:A3	1-Q0	R59	2:D2	1-K8	R141	1:L2	1-S2
C77	1:A3	1-Q0	IC14	1:F3	1-P8	R60	2:E2	1-O8	R142	2:L2	1-R1
C78	1:B3	1-R0				R61	1:B2	1-E9	R143	2:L3	1-R1
C79	2:A3	1-S0	LINK1	2:B1	1-B8	R62	1:B3	1-E9	R144	1:E3	1-E1
C80	1:B3	1-T0	L1	1:E2	1-R9	R63	1:E4	1-P8	R145	2:D3	1-F1
C81	2:F2	1-Q9	LINK1A	2:F1	1-B0	R64	2:J3	1-U8	R146	1:K3	1-I1
C82	2:F2	1-R9	LINK1B	2:F1	1-B1	R65	1:B1	1-D6	R147	2:C2	1-G9
C83	1:F2	1-Q9	LINK1C	2:F1	1-B0	R66	2:G1	1-C0	R148	1:C2	1-G8
C84	1:F2	1-Q9	LINK1D	2:F1	1-B0	R67	1:K1	1-D0	R149	2:B2	1-F8
C85	1:L3	1-U4	LINK2	2:D2	1-M8	R68	1:E3	1-D1	R150	1:B3	1-F9
C86	2:M2	1-S6	LINK3	2:G3	1-R8	R69	1:H3	1-I1	R151	2:B3	1-F9
C87	2:F3	1-S6	LINK4	2:H3	1-T8	R70	1:G3	1-G1	R152	2:G2	1-O3
C88	1:D1	1-S6	LINK5	2:H4	1-S8	R71	1:E1	1-F3	R153	1:G2	1-O3
C89	1:G3	1-P8	LINK6	2:H4	1-S8	R72	2:G1	1-B1	R154	1:L2	1-P3
C90	1:F3	1-Q8	LINK7	2:H3	1-S8	R73	1:D4	1-I3	R155	2:G2	1-N3
C91	2:G3	1-Q8	LINK8	2:H3	1-S7	R74	1:D4	1-J3	R156	2:G2	1-M2
C92	1:J3	1-G7	LINK9	2:J3	1-U7	R75	2:H2	1-L2	R157	1:H1	1-D2
C93	1:H3	1-G6	LINK10	2:H3	1-P7	R76	1:D4	1-J3	S21	1:K3	1-V5
C94	1:M2	1-U9	LINK11	2:H2	1-L7	#R77	2:J2	1-H3			1-V4
C95	1:M2	1-U9	LINK12	2:G4	1-H7	R78	1:G2	1-F3			1-V3
C96	2:L3	1-U5	LINK13	2:B1	1-C5	R79	2:E3	1-E0			1-V3
C97	1:K3	1-U3	LINK14	2:B2	1-E6	R80	2:E3	1-D0			1-V2
C98	1:B2	1-D5	LINK15	2:H2	1-U2	R81	2:J2	1-U3			1-V2
C99	1:C2	1-D6	LINK16	2:J1	1-C2	R82	1:K3	1-V2			1-V1
C100	2:B2	1-D8	LINK17	2:K2	1-G3	R83	1:B2	1-D7			1-V1
C101	1:H3	1-J7	LINK18	2:D3	1-F1	R84	2:B2	1-E6			1-V9
C102	1:H4	1-I6	LINK20	2:J2	1-S3	R85	1:B2	1-D7			1-V9
C103	1:J4	1-J6	LINK21	2:K1	1-O3	R86	2:J3	1-U7			1-V8
C104	1:J4	1-J6	LINK22A	2:K2	1-I4	R87	1:J3	1-V3			1-V7
C105	1:C3	1-I8	LINK22B	2:K2	1-I3	R88	1:K3	1-V2			1-V6
C106	1:E2	1-G0	LINK22C	2:K2	1-I3	R89	1:E3	1-N8			1-V5
C107	2:C2	1-G8	LINK22D	2:K2	1-I3	#R90	2:K3	1-V1			1-Q0
C108	1:B3	1-F8	LINK22E	2:L2	1-S1	#R91	2:K3	1-U6	S22	1:M3	1-B9
C109	2:B2	1-F8	LINK22F	2:K2	1-R3	R92	1:E3	1-O8	S23	1:M3	1-B9
C110	2:C2	1-H8	LINK23	2:F3	1-H0	R93	1:G1	1-C4	S24	1:L2	1-B5
*C120	1:H4	1-T8	LINK24	2:K2	1-N5	R94	1:L3	1-U4	S25	1:L3	1-B5
			LINK25	2:K1	1-Q1	R95	1:L3	1-U4	S26	1:D2	1-M8
D1	1:G2	1-N3	LINK26	2:K2	1-N4	R96	1:L2	1-C5	S27	1:C2	1-M9
		1-M3	LINK27	2:C2	1-H8	R97	1:L2	1-C5	S28	1:C1	1-C7
D2	1:H3	1-K7	LINK28	2:C3	1-H8	R98	2:L3	1-U5	S29	1:D1	1-C6
		1-K6				R99	1:L3	1-U5	S30	1:B2	1-C9
D3	1:D3	1-F0	P13	1:B1	1-B8	R100	2:A2	1-Q0	S31	1:C4	1-I1
D5	1:L1	1-R1			1-B8	R101	2:B3	1-S0	S32	1:H3	1-J7
		1-R2			1-B6	R102	2:B3	1-S0	S33	1:D2	1-E7
D7	1:G3	1-H1			1-B8	R103	2:L3	1-U5	S34	1:F2	1-D5
		1-I1			1-B5	R104	1:L3	1-U5	S35	1:M2	1-V0
D8	1:H2	1-B2			1-B7	R105	2:H1	1-D3			
		1-C2			1-P0	R106	2:H1	1-D2			

	LINE OUTPUT AUDIO RESPONSE	LINE OUTPUT FILTER RESPONSE	LINE OUTPUT IMPEDANCE	LINE OUTPUT IMPEDANCE	LINE OUTPUT ATTENUATION	LINE OUTPUT ATTENUATION	LINE OUTPUT ATTENUATION	LINE OUTPUT ATTENUATION	LINE INPUT LINE OUTPUT	LINE INPUT IMPEDANCE	LINE INPUT ATTENUATION	LINE INPUT ATTENUATION	LINE INPUT AUDIO RESPONSE	LINE INPUT AUDIO RESPONSE
	LINK1	LINK2	LINK3	LINK4	LINK5	LINK6	LINK7	LINK8	LINK9	LINK10	LINK11	LINK12	LINK13	LINK14
A	DE-EMPHASIS	2-POLE	600-OHM	600-OHM	0DB	15DB	0DB	15DB	LINKED	600-OHM	0DB	FLAT	PRE-EMPHASIS	FLAT
B	FLAT	6-POLE	150-OHM	150-OHM						150-OHM				
C														
D														
E														
F														
NO LINK					15DB	0DB	15DB	0DB	SEPERATED	HIGH	15DB			

	KEYING I/O	MIC MUTE	RX-GATE SENSE	OPTO DRIVER SENSE	LINE CIRCUIT ENABLE	PTT INPUT	PTT SENSE	RX-GATE / BUSY OUTPUT	TIME DELAY	TX / RX OUTPUT	NOT CLEAR TO SEND (TRUNKED ONLY)	IN-LOCK OUTPUT	LINE OUTPUT FILTER COMPONENTS	LINE OUTPUT FILTER COMPONENTS
	LINK15	LINK16	LINK17	LINK18	LINK19	LINK20	LINK21	LINK22	LINK23	LINK24	LINK25	LINK26	LINK27	LINK28
A	BIDIRECTIONAL	LINE PTT	STANDARD	STANDARD	ON AUX	STANDARD	KEY 0V	BUSY 5V	ENABLED	TX 5V / RX 0V	ENABLED	LOCKED 5V	2 POLE	2 POLE
B		NONE		T223	PERMANENT	TRUNKED	KEY 5V	BUSY 0V		TX 0V / RX 5V		LOCKED 0V	6 POLE	6 POLE
C					TRUNKED			RX-GATE 5V						
D								RX-GATE 0V						
E								TRUNKED BUSY 0V						
F								TRUNKED BUSY 5V						
NO LINK	UNIDIRECTIONAL	PERMANENT	TRUNKED		DISABLED				DISABLED	DISABLED	DISABLED	DISABLED		

	LINE MATCH	OPTO HOLD	RX_GATE DELAY
*CAPS	*C120	*C64	*C60
STANDARD	-	-	-
OPTIONAL	4N7YPI	1U0FI50	4U7FI50LESR

I/O PAD DESCRIPTIONS

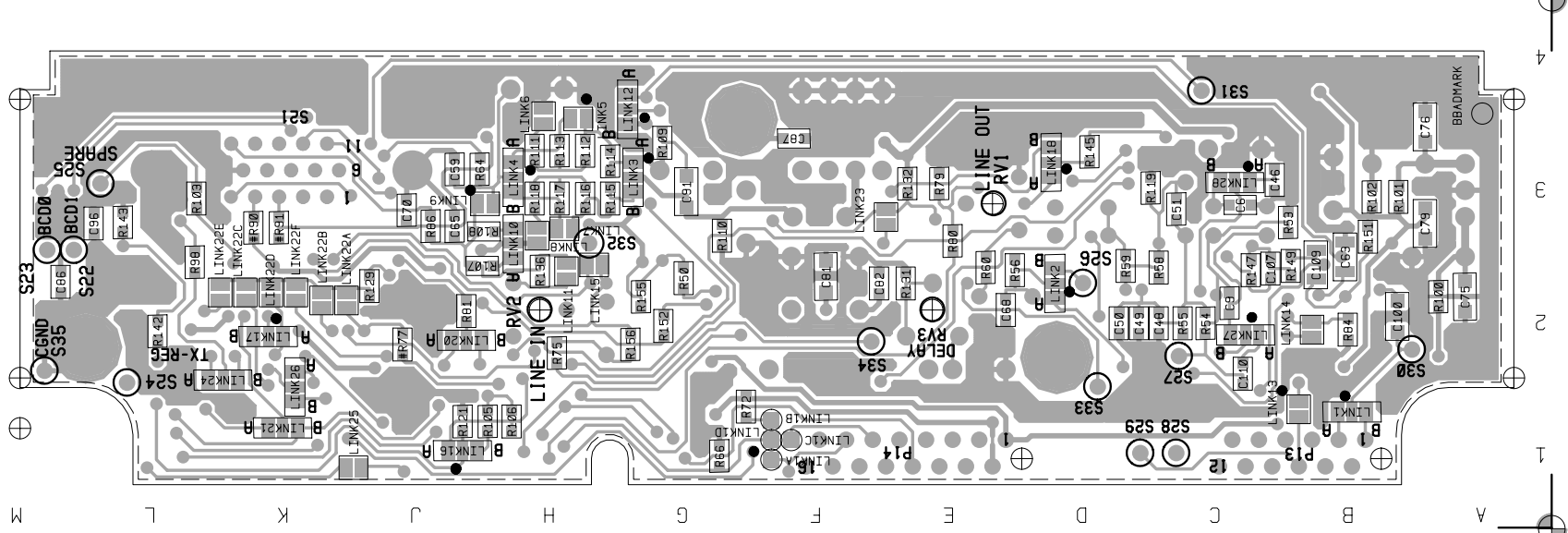
S22	BCD1
S23	BCD0
S24	TX REG
S25	SPARE
S26	6 POLE FILTER OUTPUT
S27	2 POLE FILTER OUTPUT
S28	TX SIG IN
S29	TX LINE IN
S30	RX OUT
S31	OPTO DRIVER
S32	LINE INPUT AMPLIFIER
S33	LINE OUT MUTE
S34	LINE IN MUTE
S35	CHASSIS GROUND

- Notes: 1/ Remove R77 for trunked modem operation or, in non-trunked radios, to remove external inhibit on busy.
- 2/ R90, R91 should be removed for two-wire crossband when moulded cord sets are used. (HD15M-HD15M) This is to avoid PSU conflicts between radios. (+8V out, +13V out.)

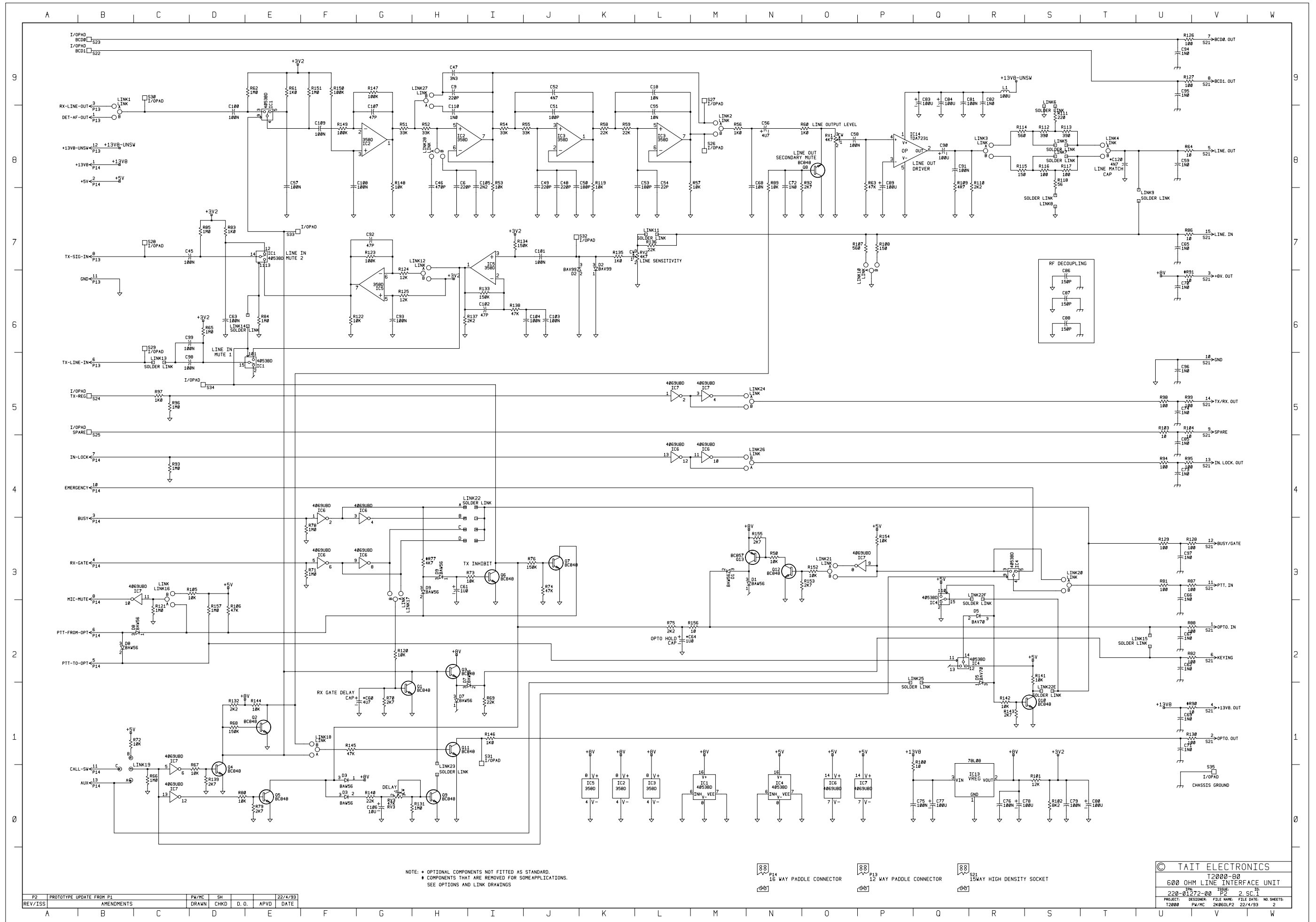
T2000-80 Variant & Options Tables (IPN 220-01272-02)







T2000-80 Line Interface PCB (IPN 220-01272-02) Bottom Side



NOTE: \* OPTIONAL COMPONENTS NOT FITTED AS STANDARD.  
 \* COMPONENTS THAT ARE REMOVED FOR SOME APPLICATIONS.  
 SEE OPTIONS AND LINK DRAWINGS

88 P14 16 WAY PADDLE CONNECTOR  
 89 P13 12 WAY PADDLE CONNECTOR  
 90 S21 15WAY HIGH DENSITY SOCKET

© TAIT ELECTRONICS  
 T2000-80  
 600 OHM LINE INTERFACE UNIT  
 220-01272-00 P2 2 S.C. 1  
 PROJECT DESIGNER FILE NAME: FILE DATE: NO SHEETS:  
 T2000 PW/NC 20860LP2 22/4/93 2

P2	PROTOTYPE UPDATE FROM P1	PW/NC	SH	D. O.	APVD	DATE
REV/ISS	AMENDMENTS	DRAWN	CHKD			

