

8.15 T2000-A70 Data Modem Kit

The T2000-A70 conventional data modem allows a T2010 or T2015 radio to be used in data applications, and also provides remote channel control via six BCD lines.

The command protocol and some test procedures are provided for those wanting to write their own software. The protocol definition is based on the T2000 CCI protocol, with specific extensions to support binary transmission and reception.

Note: This interface is only compatible with radio firmware version 2.22, or later. If you have a Series II HC05 logic PCB (PCB IPN 220-01377-0X), with v2.05 radio firmware, contact your nearest authorised Tait dealer.

After upgrading from v2.05 radio software, it is necessary to change the link resistors on the top side of the logic PCB. Remove link resistor #R714 and fit #R714A.

The following topics are covered in this Section:

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8.15.1 Components Required

The T2000-A70 kit contains the following components:

| Quantity | Description |
|----------|--|
| 1 | T2000-A70 data modem PCB assembly |
| 1 | Data interface decoupling PCB assembly (refer to Section 7.17) |
| 1 | connecting loom |
| 2 | M2.5x10mm pan Pozi Taptite screws |
| 2 | M2.5 shakeproof washer |
| 2 | M2.5 nut |
| 1 | female screw lock kit (in plastic bag)* |
| 2 | 4-40x5/16 pan Pozi Taptite screws (black) |

* Discard unused parts from the female screw lock kit.

8.15.2 Fitting

Refer to Figure 8.15.2.

- 1 Remove the top cover of the radio by unscrewing the 4 bottom cover screws, unscrew the logic PCB and fold out.
- 2 **T2000-A70 Mounting**

Position the data modem PCB on the top side of the logic PCB, as shown, matching P3 on the bottom side of the data modem PCB to connector S3 on the logic PCB.

Use the 2 M2.5x10mm screws, nuts and shakeproof washers to secure in place, as shown.

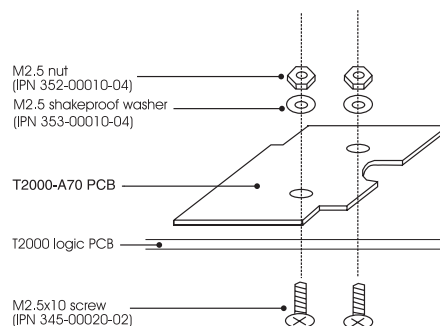


Figure 8.15.1 T2000-A70 PCB Mounting

The screws are fitted from the **bottom** of the logic PCB, and secured with the nuts and washers on the **top** side of the data modem PCB.

Torque the screws to 2.5in.lb.

Caution: Over-tightening the screws will cause damage to the data modem PCB, and compression of connector P3.

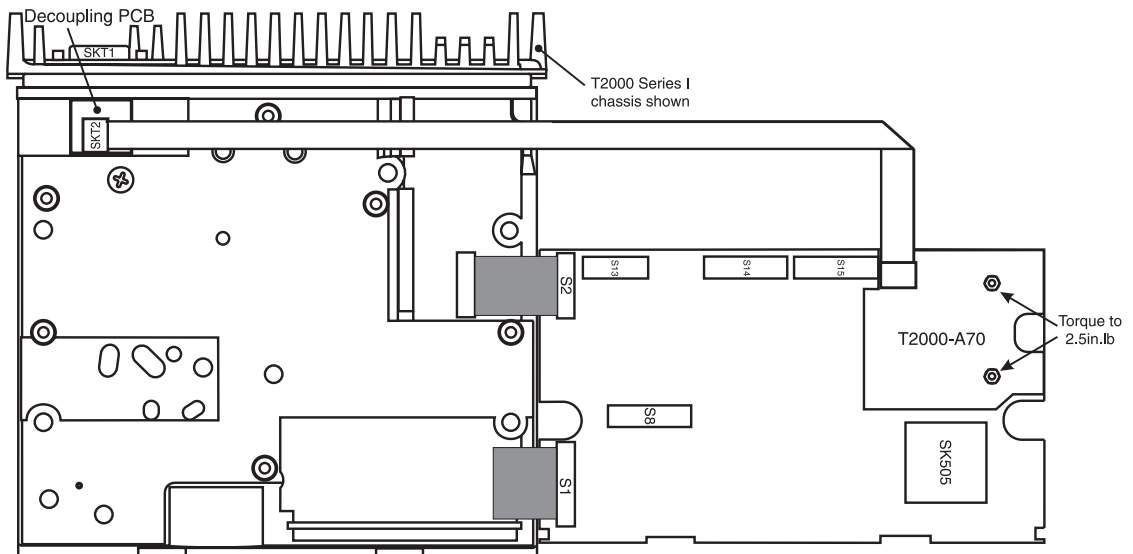


Figure 8.15.2 T2000-A70 Data Modem PCB Mounting

3 T2000 Data Interface Decoupling PCB Mounting

Unclip the D-range blanking plate in the rear of the T2000 chassis.

a T2000 Series I Chassis

Refer to Figure 8.15.3.

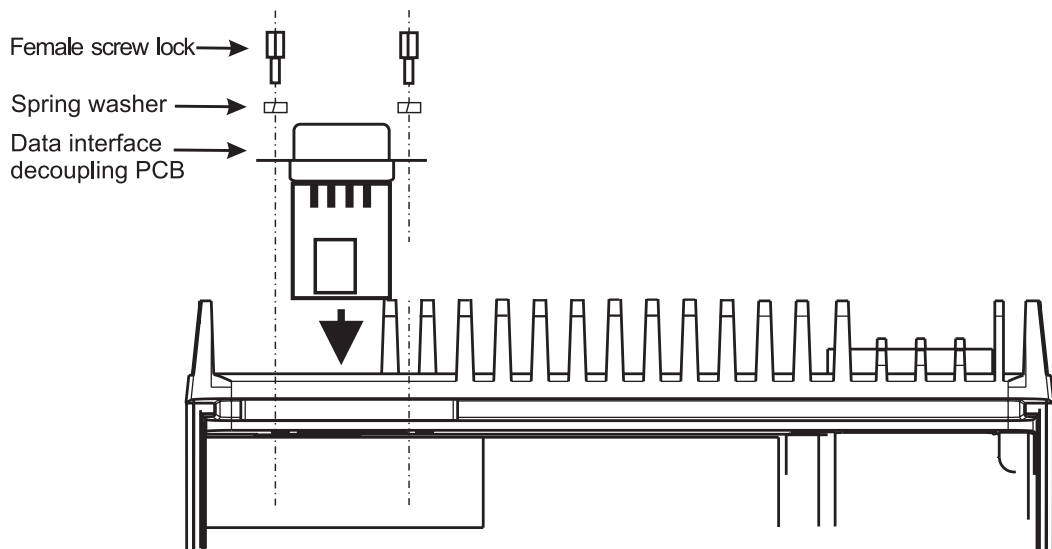


Figure 8.15.3 Data Interface Decoupling PCB Mounting: Series I Chassis

Holes are provided in the T2000 chassis for the D-range screw locks. Use the 2 black 4-40 Taptite screws provided in the kit to form threads.

Fit the decoupling PCB to the T2000 chassis, guiding the PCB through the hole provided, as shown.

Open the female screw lock kit, then secure the D-range using the 2 screw locks and spring washers.

b T2000 Series II Chassis

Refer to Figure 8.15.4.

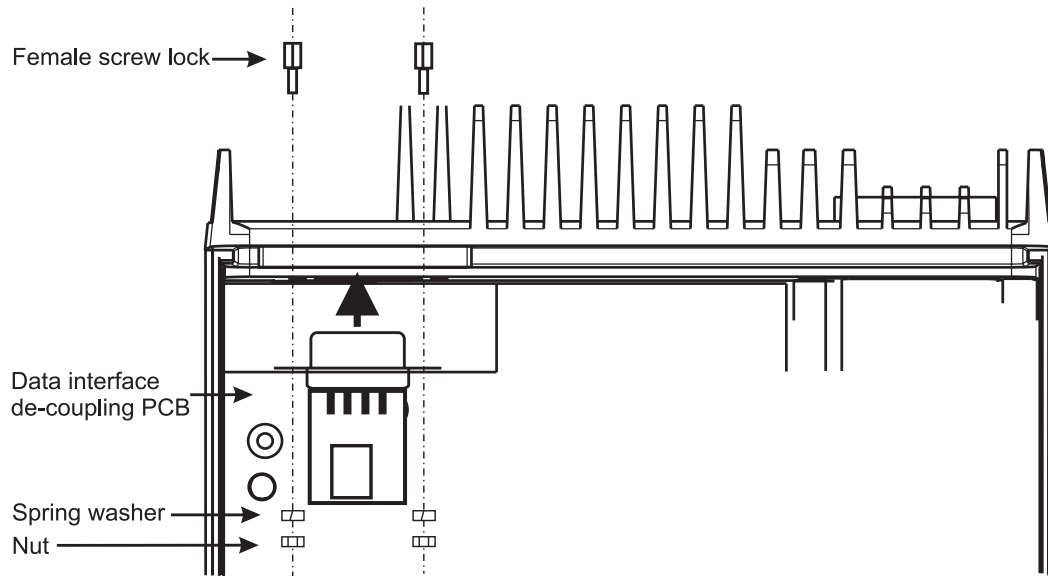


Figure 8.15.4 Data Interface Decoupling PCB Mounting: Series II Chassis

Fit the decoupling PCB to the T2000 chassis, from the inside rear of the radio, as shown.

Secure the D-range in position using the screw locks, spring washers and nuts provided in the female screw lock kit.

- 4 Fold the data modem loom as shown, then plug into SKT2 on the decoupling PCB.
- 5 Fold the logic PCB back in position, secure using the 3 logic PCB retaining screws, and refit the top cover.

Note: Check that the loom is not pinched by the cover or screws during reassembly.

8.15.3 T2000-A70 Link Options

PCB links have been provided on the T2000-A70 data modem PCB for different operational requirements. To change settings, the PCB links are either solder shorted, or fitted with 0Ω SMD resistors.

The following table sets out the link selection options on the T2000-A70 data modem PCB.

| Option | #R19 | #R2010 | #R2015 |
|-------------|------------|------------|------------|
| Baud Rate: | | | |
| 1200 | Fitted | - | - |
| 2400 | Not fitted | - | - |
| Radio Type: | | | |
| T2010 | - | Fitted | Not fitted |
| T2015 | - | Not fitted | Fitted |

8.15.4 Signal Specifications

Data Interface Decoupling PCB

The following tables describe the signals on the decoupling PCB 9 way D-range connector (SKT1) and 4 way connector (SKT2). The diagram shows the pin designations of SKT1, viewed from the rear of the radio.

Note: Pins 1, 4, 6, 7, 8 and 9 on SKT1 are connected to I/O pads, so that additional signals can be interfaced to the radio through the external connector.

| SKT1 Pin No. | Signal | Description |
|--------------|--------|--|
| 1 | PAD1 | Spare |
| 2 | TXD | Transmit data |
| 3 | RXD | Receive data |
| 4 | PAD2 | Spare |
| 5 | DGND | Ground reference for all digital signals |
| 6 | PAD3 | Spare |
| 7 | RTS | Spare |
| 8 | CTS | Spare |
| 9 | PAD4 | Spare |

| SKT2 Pin No. | Signal | Description |
|--------------|--------|--|
| 1 | DGND | Ground reference for all digital signals |
| 2 | RXD | Receive data |
| 3 | TXD | Transmit data |
| 4 | DGND | Ground reference for all digital signals |

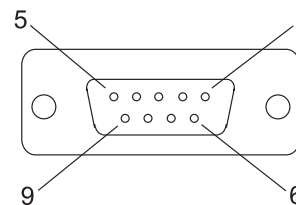


Figure 8.15.5 9 Way D-Range Connector (SKT1)

Data Modem PCB

The following tables describe the signals on the data modem PCB connectors P3 and PDL-1. For P3 signal descriptions, refer to Section 5.9, "Options Interface Specifications".

| P3 Pin No. | Signal |
|------------|------------|
| 1 | BCD-0 |
| 2 | BCD-1 |
| 3 | BCD-2 |
| 4 | BCD-3 |
| 5 | BCD-4 |
| 6 | BCD-5 |
| 7 | TX-SIG-IN |
| 8 | DET-AF-OUT |
| 9 | /BUSY |
| 10 | N/C |

| P3 Pin No. | Signal |
|------------|--------------|
| 11 | /PTT-TO-OPT |
| 12 | /RX-GATE |
| 13 | /IN-LOCK |
| 14 | /PTT-FRM-OPT |
| 15 | /SIG-SQUELCH |
| 16 | MIC-MUTE |
| 17 | DGND |
| 18 | PWR-CTRL |
| 19 | GND |
| 20 | +5V |

| PDL-1 Pin No. | Signal | Description |
|---------------|--------|--|
| 1 | DGND | Ground reference for all digital signals |
| 2 | TXD | Transmit data |
| 3 | RXD | Receive data |
| 4 | DGND | Ground reference for all digital signals |

8.15.5 Programming

For those wanting to write their own software, the command protocol and some test procedures are provided in this Section. The protocol definition is based on the T2000 CCI protocol, with specific extensions to support binary transmission and reception.

Note: For modem control of channel change, the **BCD Channel Selection** field in the **Edit - Options** menu must be set to *Enabled* during radio programming.

Common Abbreviations

CCI Computer Controlled Interface
DTE Data Terminal Equipment (e.g. Computer, *inform* data head)
RU Radio Unit
RXD Received Data
TXD Transmitted Data

Command Protocol Description

The DTE is connected to the RU via a serial port on the data modem PCB. Commands are generated by the DTE, and responses or unsolicited messages returned by the RU. There is a prescribed format for all messages, which allows transmission errors to be detected.

Control of the RU is accomplished by the DTE sending a command sequence (a “packet”) and receiving a response (a “transaction”). Unsolicited messages may originate from the RU.

The RU will issue a prompt character to indicate to the DTE that it is ready to accept a new command. After issuing a command, the DTE must wait for another prompt before beginning the next transaction. The prompt character is “.” (full stop, ASCII code = \$2E).

Messages directed to the RU will always be responded to, either explicitly by means of a return message (“Ready” or “Error”), or implicitly, by just the prompt “.” being issued.

The RU will not originate a message: messages returned by the RU are for information purposes only, and no reply will be expected from the DTE.

This protocol definition is based on the T2000 CCI protocol, with specific extensions to support binary data transmission and reception.

Message Format

All message packets take the general form:

[IDENT][SIZE][PARAMETERS][CHECKSUM]<CR>

The following table explains each component of the message packet.

| Message Component | Description |
|-------------------|---|
| [IDENT] | The message identifier. Identifiers are single ASCII characters (lower-case alphabetical) which categorise the message type. |
| [SIZE] | The number of characters which make up the [PARAMETERS] field. [SIZE] is an 8-bit number expressed in ASCII-hex notation (two characters). |
| [PARAMETERS] | An optional field, depending upon the command. Parameter values are generally character strings, unless explicitly stated otherwise. Parameter type is dependent upon the command - there is no explicit type definition. |
| [CHECKSUM] | An 8 bit checksum of fields [IDENT], [SIZE] and [PARAMETERS]. It is expressed in ASCII-hex notation (two characters). Calculating [CHECKSUM]: [CHECKSUM] is calculated by applying the following algorithm: <ol style="list-style-type: none"> 1 Take the modulo-2 sum of all message bytes preceding [CHECKSUM]. 2 Retain bits 0 to 7, discarding any higher order bits resulting from the summation. 3 Form the two's complement of the remainder. 4 Convert the binary number into two ASCII-hex digits, MSD first. |
| <CR> | The packet terminator. It is the ASCII "carriage return" character (\$0D). |

Table 8.15.1 Message Format

General message format characteristics:

- All fields in a message are encoded in ASCII, except for the [PARAMETERS] field of the transmit and receive commands, which is encoded in Binary.
- Where numeric values are represented in ASCII-hex notation (two characters per byte), digits A to F are upper case.
- The minimum length of a command packet is 5 characters (i.e. this is when [SIZE] = 00).
- The maximum length of the [PARAMETERS] field is 111 characters. The maximum length of the command packet is therefore 116 characters ([SIZE] = 0x6F).

Messages To The RU

If the RU receives a command without error, and all parameters are valid, then the command will be executed and an acknowledge will be returned to the DTE. If an error arises, the DTE will be notified with an appropriate response.

The following Table describes the commands available to the DTE to control operation of the RU.

| Command | Description | Message | | Comments |
|----------------------|--|---------|---|---|
| | | [IDENT] | [PARAMETERS] | |
| Go To Channel | This forces the RU to change to another (conventional) channel. | g | [CHANNEL NUMBER] This is a string of characters representing the new channel number. The range of allowed characters is 0 to 9 only, and the maximum number of digits is 3. Valid channel numbers are 1 to [NUM CHANNELS]. | The value of [CHANNEL NUMBER] must be valid for the RU being controlled. The range of allowed values depends upon the RU's programming, type and the link selections on the data modem PCB (refer to Section 8.15.3). The maximum allowable value is returned by the 'Query' command. |
| Query | This requests the RU to respond with a block of data identifying the type of RU attached, and the version of modem firmware. | q | None | The Query data is returned to the DTE as a 'Query Response' message (refer to "Messages from the RU"). |
| Transmit | This requests the RU to broadcast a block of data on the radio channel. | b | The data to broadcast is encoded as binary data. Note that this field may contain unprintable ASCII characters (such as CR/LF) and protocol command characters (such as ". "). | The maximum length of data that may be sent with the 'Transmit' command is 111 characters. |
| Null | This requests the RU to return an acknowledgement to the DTE. The DTE can use this command to check that an RU is connected. | n | None | |

Table 8.15.2 Messages To The Radio Unit

Messages From The RU

Messages may be sent to the DTE by the radio as part of a transaction (i.e. in response to a command issued by the DTE) or unsolicited. In the case of solicited commands, the prompt character will be issued after the RU response to terminate the transaction and signify that another may begin.

Note: In the case of solicited commands, the prompt character, “.”, will be issued after the RU response, to terminate the transaction and signify that another may begin.

Unsolicited commands from the RU will not cause the issuing of the prompt character, as it is possible for an unsolicited command (e.g. Receive) to occur during a solicited command (e.g. Transmit).

The following Table describes messages from the RU to the DTE.

| Command | Description | Message | | Comments |
|-----------------------|---|---------|--|---|
| | | [IDENT] | [PARAMETERS] | |
| Receive | Unsolicited. This presents data received by the RU to the DTE. The data received by the RU has been broadcast by another RU/DTE, using the Transmit command. | i | The data received is encoded as binary data. Note that this field may contain unprintable ASCII characters (such as CR/LF) and protocol command characters (such as ‘.’). | |
| Query Response | Solicited The RU’s response to a Query command. | m | <p>[RU TYPE] A single character, representing the model of the RU. 0 = unknown 3 = T2010 4 = T2015</p> <p>[VERSION] Firmware version. A character string, in the format of X.XX, identifying the capabilities of the RU/modem.</p> <p>[PVERSION] Protocol Version. A character string, in the format of X.XX, identifying the command protocol version supported.</p> <p>[NUM CHANNELS] The number of channels supported by the Go To Channel command. A 3 digit ASCII number.</p> | <p>1 The value of [PVERSION] = 1.01 is reserved for the first release of firmware implementing this command protocol. Subsequent enhancements and major upgrades will increment this number accordingly.</p> <p>2 Additional fields may be added to this message in future releases to provide more information about the RU environment. In particular, it may be necessary to pass the DTE some information on how the RU has been programmed, or what optional hardware is fitted.</p> |
| Ready | “.” This response indicates that a transaction has been completed, and the RU is ready for the next command. | None | None | After issuing a command, the DTE must wait for another prompt before beginning the next transaction. |

Continued on next page

| Command | Description | Message | | Comments |
|--------------|---|---------|--|--|
| | | [IDENT] | [PARAMETERS] | |
| Error | <p>Solicited response to a transaction error. This advises the DTE that the RU has detected an error condition and cannot proceed with the current transaction.</p> <p>Unsolicited response to a system error.</p> <p>In some cases, an exception condition in the RU may cause an 'Error' message to be sent to the DTE independently of any control transactions. A prompt or 'Ready' will be issued after an 'Error' occurs, to indicate the RU's availability to accept further commands.</p> | e | <p>[ETYPE] Error type. A single character representing the error category. 0 = transaction error. This indicates some problem with communications. All such errors result in the transaction being terminated, without the current command being executed.</p> <p>[ENUM] Error number. A character string representing a decimal number in the range of 00 to 99, which can identify the specific error condition. For [ETYPE] = 0, 01 = unsupported command 02 = checksum error 03 = parameter error 10 = communication failure 20 = invalid channel number</p> | <p>Transition error numbers ([ETYPE] = 0):</p> <p>1 0x01 = unsupported command error This may arise when the DTE expects a later version of RU than is attached, and attempts to use a command which is not recognised by the RU.</p> <p>2 0x02 = checksum error indicates that the checksum calculated by the RU did not match the one received in the command packet.</p> <p>3 0x03 = parameter error This encompasses values out of range, or missing fields.</p> <p>4 0x10 = communication failure This encompasses all low level mechanisms, i.e. framing error, overrun error, parity error etc.</p> <p>5 0x20 = invalid channel number This may arise when the DTE issues a 'Go To Channel' command with a [CHANNEL NUMBER] exceeding the maximum allowable number.</p> |

Table 8.15.3 Messages From The Radio Unit

Software Tests

The following Table explains the commands that may be sent to test the software.

| Command | Test Procedure | Expected Result |
|----------------------------|---|--|
| Go To Channel | 1. Send command "g01206" | Radio changes channel to 2, then returns the command prompt. |
| | 2. Send command "g0203D4" | Radio changes channel to 3, then returns the command prompt. |
| | 3. Send command "g03004A2" | Radio changes channel to 4, then returns the command prompt. |
| | 4. Send command "g0225D0" | Radio sends error message "e03020A6" (invalid channel) |
| Transmit | 1. Send command "b04this82" | Radio transmits this data and "i04this7B" is received by the other radio. |
| | 2. Send command "b17This is a test command.14" | Radio transmits this data and "i17This is a test command.0D" is received by the other radio. |
| | 3. Send a "b" command while the PTT is pressed. | Radio sends error message "e03010A7" (communication error) |
| | 4. Send a command while the busy led is lit | Radio sends error message "e03010A7" (communication error) |
| Null | Send command "n0032" | Radio returns a prompt ("."). |
| Query | Send command "q002F" | <p>T2010: a valid message could be "m0C31.011.01004D9" i.e. [RU TYPE] = T2010, [VERSION] = 1.01 [PVERSION] = 1.01 [NUM CHANNELS] = 04</p> <p>T2015: a valid message could be "m0C41.011.01024D6" [RU TYPE] = T2015, [VERSION] = 1.01 [PVERSION] = 1.01 [NUM CHANNELS] = 24</p> |
| Command Line Errors | 1. Send command "b03this83" | Radio sends error message "e03003A5" (parameter error). |
| | 2. Send command "b04this83" | Radio sends error message "e03002A6" (checksum error). |
| | 3. Send command "t04this70" | Radio sends error message "e03001A7" (unsupported command). |

Table 8.15.4 Software Test Commands

8.15.6 Circuit Description

The T2000-A70 data modem PCB is based on a CML FX469LS 1200/2400 baud FFSK modem IC (IC1) and the baud rate is selectable by PCB links.

Receive audio is recovered and fed into IC1 via a buffer amplifier, with filtering (IC5), to attenuate all but the FFSK tones. The signal is demodulated in IC1 and the data fed into the microprocessor, IC2. The data, complete with its length & checksum information, is fed to the DTE via IC4, which converts the 0V/5V TTL levels to RS232.

On transmit, data is sent from the DTE to IC2, via IC4. It is processed and sent on to IC1, where it is modulated and the output goes to the TX-SIG-IN input of the radio, via a unity gain buffer, IC6. IC2 also monitors inputs from the radio's logic PCB and controls various output lines.

The microprocessor checks that the radio is in lock, and is not busy. It then mutes the microphone, activates the radio PTT and 30ms later, the PWR-CTRL signal goes low, releasing the transmit inhibit.

Both buffer amplifiers are biased at half rail by IC1, pin11.

If a channel change is required, the data is sent to IC7, which toggles the appropriate BCD lines to change the radio channel.

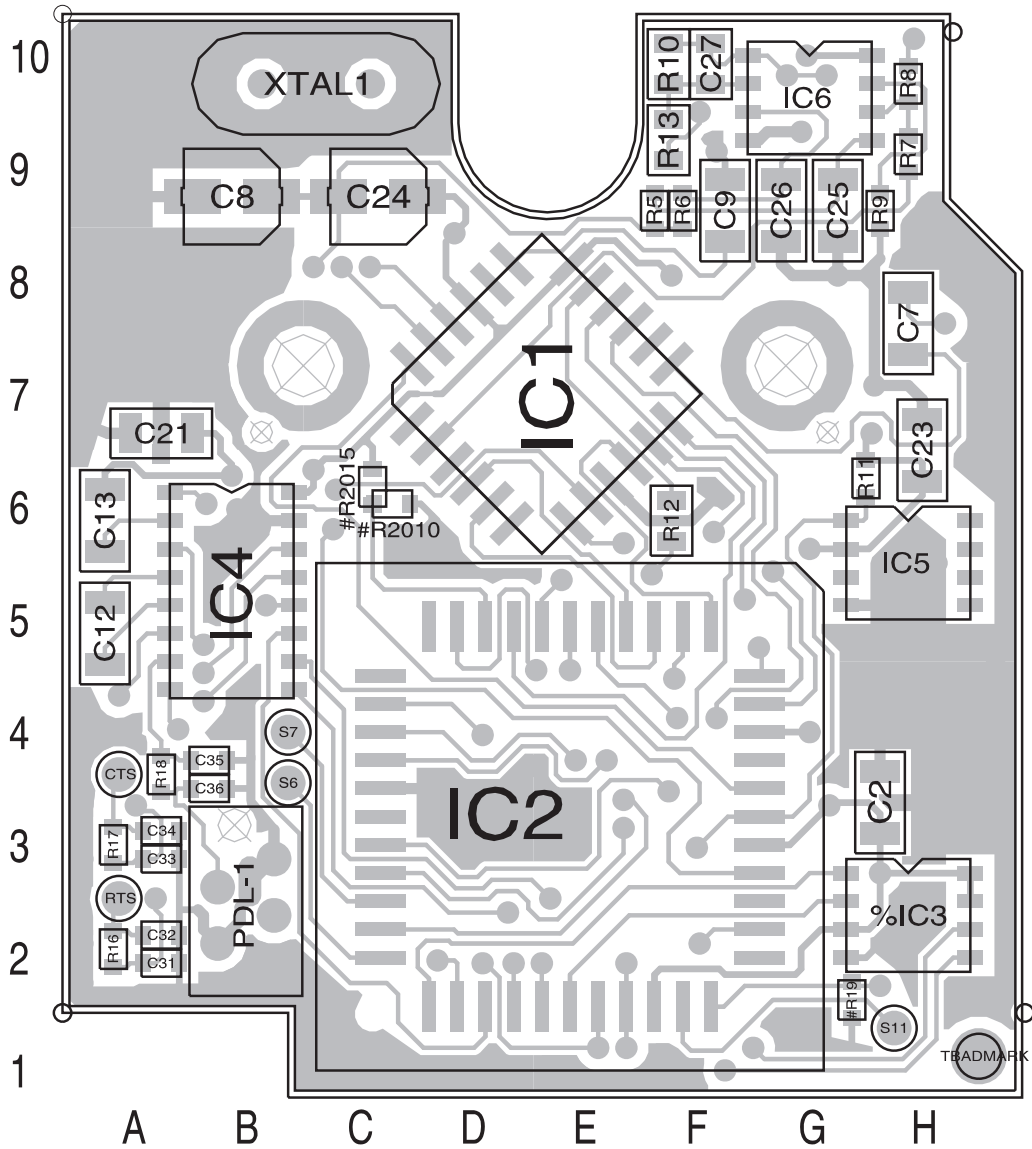
8.15.7 PCB Information

T2000-A70 Parts List (IPN 220-01378-01)

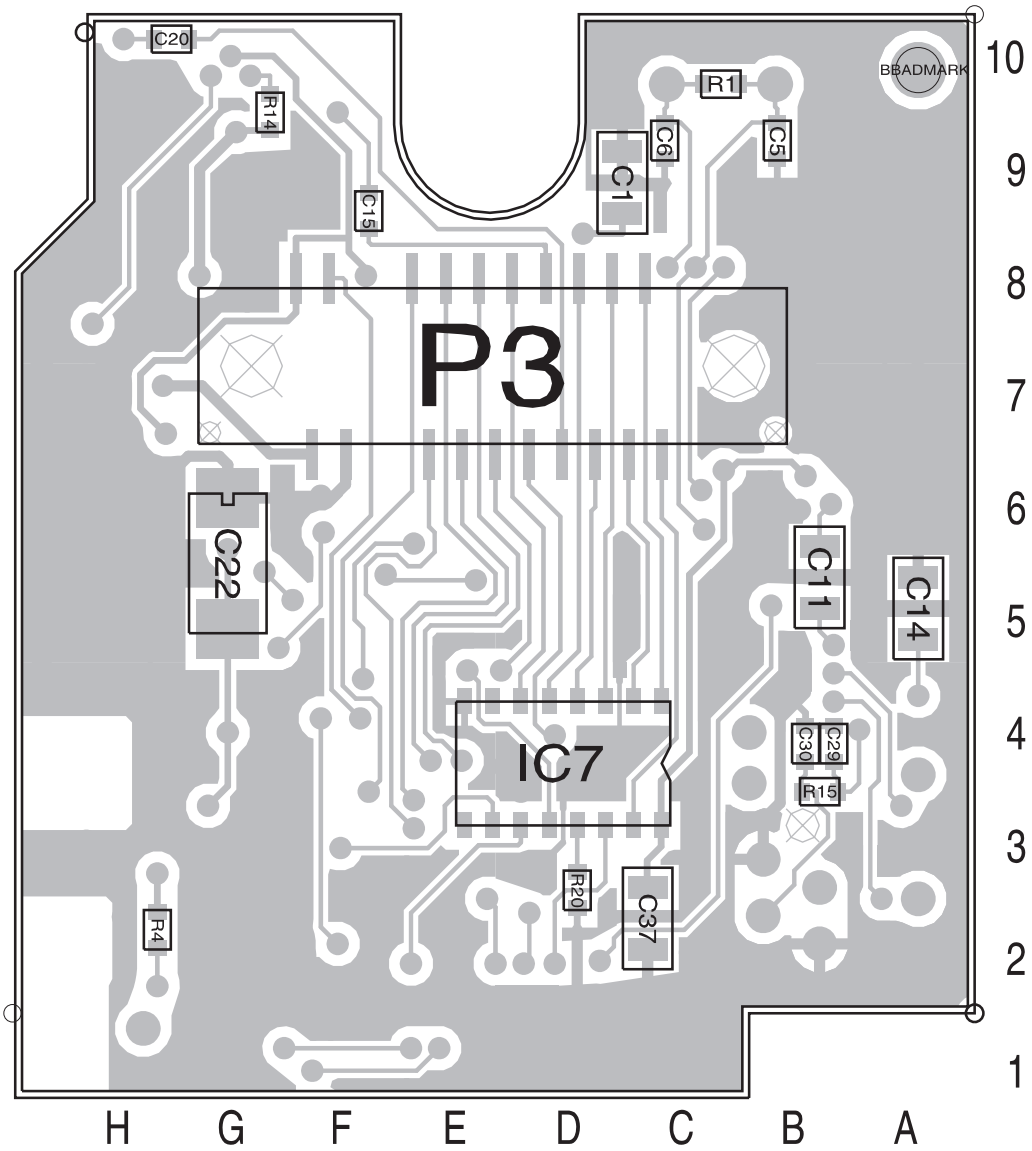
| Ref | IPN | Description | Ref | IPN | Description |
|--------|--------------|---|--------------|-----|--|
| C1 | 015-06100-08 | CAP CER 1206 CHIP 100N 10% X7R 50V | 365-00011-38 | | LABEL STATIC WARNING YELLOW A4A315 |
| C2 | 015-06100-08 | CAP CER 1206 CHIP 100N 10% X7R 50V | 365-00011-54 | | LABEL WHITE RW1556/2 90*24MM SPECIAL ADH |
| C5 | 018-12220-10 | CAP 0603 CHIP 22P 50V NPO +-1% | 399-00010-51 | | BAG PLASTIC 75*100MM |
| C6 | 018-12330-10 | CAP 0603 CHIP 33P 50V NPO +-1% | 399-00010-87 | | BAG STATIC SHIELDING 102X152MM |
| C7 | 015-06100-08 | CAP CER 1206 CHIP 100N 10% X7R 50V | 410-00010-60 | | CARTON 150X112X56MM VICTOR |
| C8 | 016-07100-01 | CAP ELECT 6X4MM CHIP 1M 20% 16V | 418-27000-00 | | FITTING INS T2000-70 MODEM KIT |
| C9 | 015-06100-08 | CAP CER 1206 CHIP 100N 10% X7R 50V | X2DC01 | | T2000 INT FACE DECOUPLING PCB ASSEMBLY |
| C11 | 015-06100-08 | CAP CER 1206 CHIP 100N 10% X7R 50V | | | |
| C12 | 015-06100-08 | CAP CER 1206 CHIP 100N 10% X7R 50V | | | |
| C13 | 015-06100-08 | CAP CER 1206 CHIP 100N 10% X7R 50V | | | |
| C14 | 015-06100-08 | CAP CER 1206 CHIP 100N 10% X7R 50V | | | |
| C15 | 018-15100-00 | CAP 0603 CHIP 10N 50V X7R +-10% | | | |
| C20 | 018-15100-00 | CAP 0603 CHIP 10N 50V X7R +-10% | | | |
| C21 | 015-06100-08 | CAP CER 1206 CHIP 100N 10% X7R 50V | | | |
| C22 | 014-08100-00 | CAP TANT CHIP 10M 16VW +-20% 6X3.2X2.5MM | | | |
| C23 | 015-06100-08 | CAP CER 1206 CHIP 100N 10% X7R 50V | | | |
| C24 | 016-07100-01 | CAP ELECT 6X4MM CHIP 1M 20% 16V | | | |
| C25 | 015-06100-08 | CAP CER 1206 CHIP 100N 10% X7R 50V | | | |
| C26 | 015-06100-08 | CAP CER 1206 CHIP 100N 10% X7R 50V | | | |
| C27 | 015-23470-08 | CAP CER 0805 CHIP 470P 10% X7R 50V | | | |
| C29 | 018-13150-00 | CAP 0603 CHIP 150P 50V NPO +-5% | | | |
| C30 | 018-13150-00 | CAP 0603 CHIP 150P 50V NPO +-5% | | | |
| C31 | 018-13150-00 | CAP 0603 CHIP 150P 50V NPO +-5% | | | |
| C32 | 018-13150-00 | CAP 0603 CHIP 150P 50V NPO +-5% | | | |
| C33 | 018-13150-00 | CAP 0603 CHIP 150P 50V NPO +-5% | | | |
| C34 | 018-13150-00 | CAP 0603 CHIP 150P 50V NPO +-5% | | | |
| C35 | 018-13150-00 | CAP 0603 CHIP 150P 50V NPO +-5% | | | |
| C36 | 018-13150-00 | CAP 0603 CHIP 150P 50V NPO +-5% | | | |
| C37 | 015-06100-08 | CAP CER 1206 CHIP 100N 10% X7R 50V | | | |
| IC1 | 002-20046-90 | (S) IC FX469LS FFSK MODEM 1200/2400 BAUD | | | |
| IC2 | 002-20068-07 | (S) IC MC68HC705C8FN 1 TIME PROG MICRO-P | | | |
| IC4 | 002-10020-20 | (LSH) IC SMD ADM202 RS-232 CONVERTOR SO- | | | |
| IC5 | 002-10340-64 | (S) IC SMD MC34064 LO VOLT SENSE | | | |
| IC6 | 002-10003-58 | (S) IC SMD LM358 DUAL OP AMP | | | |
| IC7 | 002-74905-95 | (S) IC SMD 74HC595 SHIFT REGISTER | | | |
| PDL-1 | 240-00021-20 | HEADER 4WAY PADDLE BRD STAGGERED PINS | | | |
| P3 | 240-10000-10 | CONN SMD 20PIN SCREW DOWN PRICKLE CON | | | |
| R1 | 038-17100-00 | RES 0603 CHIP 1M 1/16W +-5% | | | |
| R4 | 038-16100-00 | RES 0603 CHIP 100K 1/16W +-5% | | | |
| R5 | 038-16100-00 | RES 0603 CHIP 100K 1/16W +-5% | | | |
| R6 | 038-16100-00 | RES 0603 CHIP 100K 1/16W +-5% | | | |
| R7 | 038-15100-00 | RES 0603 CHIP 10K 1/16W +-5% | | | |
| R8 | 038-15100-00 | RES 0603 CHIP 10K 1/16W +-5% | | | |
| R9 | 038-14470-00 | RES 0603 CHIP 4K7 1/16W +-5% | | | |
| R10 | 036-15560-00 | RES M/F 0805 CHIP 56K 5% | | | |
| R11 | 038-16100-00 | RES 0603 CHIP 100K 1/16W +-5% | | | |
| R13 | 036-15330-00 | RES M/F 0805 CHIP 33K 5% | | | |
| R14 | 038-14470-00 | RES 0603 CHIP 4K7 1/16W +-5% | | | |
| R15 | 038-13100-00 | RES 0603 CHIP 100E 1/16W +-5% | | | |
| R16 | 038-13100-00 | RES 0603 CHIP 100E 1/16W +-5% | | | |
| R17 | 038-13100-00 | RES 0603 CHIP 100E 1/16W +-5% | | | |
| R18 | 038-13100-00 | RES 0603 CHIP 100E 1/16W +-5% | | | |
| R20 | 038-14100-00 | RES 0603 CHIP 1K0 1/16W +-5% | | | |
| #R2010 | 038-10000-00 | RES 0603 CHIP ZERO OHM 1/16W +-5% | | | |
| SK2 | 240-04020-42 | SKT 44 PIN SMD PLCC CHIP CARRIER | | | |
| XTAL1 | 274-01070-00 | XTAL 4.000MHZ HC49U/S C/W TEFLON INSULAT | | | |
| | 205-00010-13 | CABLE FLAT RBBN 10 CORE 10/7/0 1 GREY | | | |
| | 220-01378-01 | (L) PCB T201X SII 1200/2400 BAUD DATA MODEM | | | |
| | 345-00020-02 | SCREW M2.5 * 10 PAN POZI ST BZ | | | |
| | 352-00010-04 | NUT M2.5 MACH HEX ST BZ | | | |
| | 353-00010-04 | WASHER M2.5/M2.6 SHAKEPROOF INT BZ | | | |
| | 316-80032-00 | PKG FOAM A4M2495 | | | |

T2000-A70 Grid Reference Index (IPN 220-01378-01)

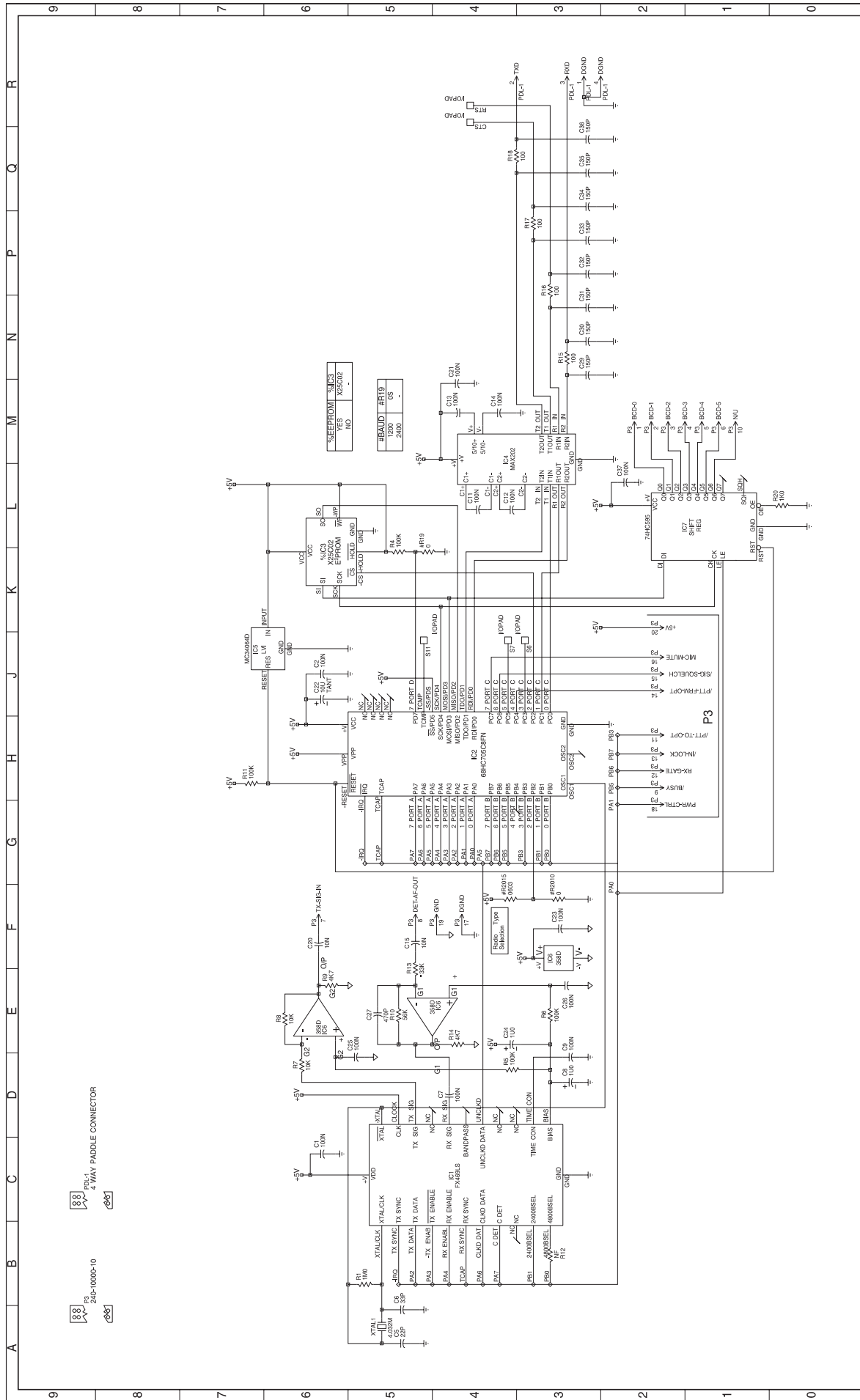
| Device | PCB | Circuit | Device | PCB | Circuit | Device | PCB | Circuit |
|--------|-------|---------|--------|-------|---------|--------|-----|---------|
| C1 | 2:D9 | 1-C6 | S6 | 1:B4 | 1-J3 | | | |
| C2 | 1:H4 | 1-J6 | S7 | 1:B4 | 1-J4 | | | |
| C5 | 2:B9 | 1-A5 | S11 | 1:H2 | 1-J5 | | | |
| C6 | 2:C9 | 1-A5 | | | | | | |
| C7 | 1:H8 | 1-D4 | XTAL1 | 1:C10 | 1-A5 | | | |
| C8 | 1:B9 | 1-D3 | | | | | | |
| C9 | 1:F9 | 1-D3 | | | | | | |
| C11 | 2:B6 | 1-L4 | | | | | | |
| C12 | 1:A5 | 1-L4 | | | | | | |
| C13 | 1:A6 | 1-M4 | | | | | | |
| C14 | 2:A5 | 1-M4 | | | | | | |
| C15 | 2:F9 | 1-F5 | | | | | | |
| C20 | 2:H10 | 1-F6 | | | | | | |
| C21 | 1:A7 | 1-M4 | | | | | | |
| C22 | 2:G6 | 1-J6 | | | | | | |
| C23 | 1:H7 | 1-F3 | | | | | | |
| C24 | 1:C9 | 1-E4 | | | | | | |
| C25 | 1:G9 | 1-D5 | | | | | | |
| C26 | 1:G9 | 1-E3 | | | | | | |
| C27 | 1:F10 | 1-E5 | | | | | | |
| C29 | 2:B4 | 1-N3 | | | | | | |
| C30 | 2:B4 | 1-N3 | | | | | | |
| C31 | 1:A2 | 1-N3 | | | | | | |
| C32 | 1:A2 | 1-P3 | | | | | | |
| C33 | 1:A3 | 1-P3 | | | | | | |
| C34 | 1:A3 | 1-Q3 | | | | | | |
| C35 | 1:B4 | 1-Q3 | | | | | | |
| C36 | 1:B4 | 1-Q3 | | | | | | |
| C37 | 2:C2 | 1-L2 | | | | | | |
| CTS | 1:A4 | 1-R4 | | | | | | |
| IC1 | 1:E7 | 1-B3 | | | | | | |
| IC2 | 1:E3 | 1-H3 | | | | | | |
| %IC3 | 1:H3 | 1-K5 | | | | | | |
| IC4 | 1:B5 | 1-L3 | | | | | | |
| IC5 | 1:H6 | 1-K6 | | | | | | |
| IC6 | 1:G10 | 1-E6 | | | | | | |
| IC6 | 1:G10 | 1-E5 | | | | | | |
| IC6 | 1:G10 | 1-F3 | | | | | | |
| IC7 | 2:D4 | 1-K1 | | | | | | |
| P3 | 2:E7 | 1-A8 | | | | | | |
| PDL-1 | 1:B3 | 1-C8 | | | | | | |
| R1 | 2:C10 | 1-B5 | | | | | | |
| R4 | 2:H2 | 1-K5 | | | | | | |
| R5 | 1:F9 | 1-D4 | | | | | | |
| R6 | 1:F9 | 1-E3 | | | | | | |
| R7 | 1:H9 | 1-D6 | | | | | | |
| R8 | 1:H10 | 1-E6 | | | | | | |
| R9 | 1:H9 | 1-E6 | | | | | | |
| R10 | 1:F10 | 1-E5 | | | | | | |
| R11 | 1:H6 | 1-H7 | | | | | | |
| R12 | 1:F6 | 1-B3 | | | | | | |
| R13 | 1:F9 | 1-F5 | | | | | | |
| R14 | 2:G10 | 1-E4 | | | | | | |
| R15 | 2:B4 | 1-N3 | | | | | | |
| R16 | 1:A2 | 1-P3 | | | | | | |
| R17 | 1:A3 | 1-P3 | | | | | | |
| R18 | 1:A4 | 1-Q4 | | | | | | |
| #R19 | 1:G2 | 1-K5 | | | | | | |
| R20 | 2:D3 | 1-L0 | | | | | | |
| #R2010 | 1:C6 | 1-F3 | | | | | | |
| #R2015 | 1:C6 | 1-F4 | | | | | | |
| RTS | 1:A3 | 1-R4 | | | | | | |



T2000-A70 Data Modem PCB (IPN 220-01378-01) - Top Side



T2000-70 Data Modem PCB (IPN 220-01378-01) - Bottom Side



© TAIT ELECTRONICS
 T2000 SERIES II
 1K2/2K4 BAUD DATA MODEM
 REV. A
 220-01378-01
 PRODUCT DESIGNER FILE NAME: M38BETS
 T2000 S2 DJW 17/03/97 04/03/97 2

| REV | DATE | BY | CHKD | APPD | DATE |
|-----|----------|-----|------|------|------|
| 1A | 04/03/97 | DBI | DBI | APV | |
| 1B | 17/03/97 | DBI | DBI | APV | |
| 1C | | | | | |
| 1D | | | | | |
| 1E | | | | | |
| 1F | | | | | |
| 1G | | | | | |
| 1H | | | | | |
| 1I | | | | | |
| 1J | | | | | |
| 1K | | | | | |
| 1L | | | | | |
| 1M | | | | | |
| 1N | | | | | |
| 1O | | | | | |
| 1P | | | | | |
| 1Q | | | | | |
| 1R | | | | | |

