TACT

TELEPHONE ACCESS CONTROL TERMINAL

OPERATOR MANUAL

MODEL TA-7

MODEL TA-7R

TWO WAY RADIO / TELEPHONE INTERCONNECT

AUSTEL PERMIT NUMBER C86/43/103
NEW ZEALAND TELEPERMIT PTC 210/89/007
ACA SUPPLIER'S CODE N468

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NOTE:

The deviation setting of the TACT may vary with your radio system.

- For systems with 25kHz channel spacing the deviation should be set to 2.5kHz.
- For systems with 12.5kHz channel spacing the deviation should be set to 1.25kHz.

CONTENTS

SECTION 1

INTRODUCTION

DESCRIPTION

The TACT interconnect terminal provides dial access to a PABX or the Public Switched Telephone Network via either a single frequency base station (or fixed mobile) or a two frequency base-repeater and is suitable for both VHF and UHF radio systems.

Mobile radios or hand-held portables must have DTMF dial pads to selectively access the telephone network.

TACT is capable of both simplex and duplex operation. In simplex mode, TACT employs a software controlled VOX which automatically compensates for variations in line levels, and also continuously monitors ambient background noises and adjusts thresholds accordingly. This feature makes TACT simple to install and reliable in operation.

TACT may be equipped with a paging option which turns it into a powerful dial-up paging terminal. The paging option is totally under software control and is therefore capable of encoding Two Tone Motorola and Five Tone Sequential protocols including EIA, CCIR and ZVEI tone sets.

The TACT terminal is available in both a desk top version (Model TA-7) and a one unit high 19" rack mounted version (Model TA-7R).

CONNECTION

TACT can be connected directly to a ‘TELCO’ exchange line, a PABX extension or to a Key System analogue extension port. This becomes the number where all telephone calls on the mobile system will originate and terminate.

WARRANTY

TACT has a warranty against defects for TWO YEARS from date of purchase. Within this period, repairs if necessary, are without charge for parts and labour. This warranty does not cover equipment subjected to misuse or accidental damage nor does it cover transportation costs.

Warranty claims are applicable to the original purchaser only and must be accompanied by the original purchase receipt.

SECTION 2

FEATURE & OPTION SUMMARY

STANDARD FEATURES

The TACT unit is equipped with the following standard features:

1) Dipswitch Options

The eight position dipswitch is located internally and may be switched to tailor the system to a client's needs as follows:

1. Diagnostic/Normal Operation
2. Simplex/Duplex Operation
3. Decadic/DTMF Dialling
4. Manual/Auto Answer - Line 1
5. Delayed/Immediate Ringing
6. Manual/Auto Answer - Line 2
7. Disable/Enable STD & IDD
8. PABX Extension/Exchange Line

These options are detailed in Sections 4 & 5 of this manual.

2) Abbreviated Memory Dialling for up to Nine (or Ninety Nine) Numbers (Refer Section 3 and Appendix F).

3) Last Number Redial (Refer Section 3).

4) Two Line Operation & Hold Feature (Refer Section 3).

5) Microprocessor Controlled VOX in Simplex Operation (Refer Section 4).

6) Memory Protection via Non-Volatile RAM (EEPROM).

7) Calling Party Disconnect.

8) Remote On/Off (Refer Section 3)

9) Delayed Auto Answer.

10) Hook flash.

HARDWARE OPTIONS

TACT may also be ordered with the following hardware options:

1) Alarm Input (Refer Section 3).

2) Auxiliary Output Relay (Refer Section 3).

3) Paging Option (Refer Section 3).

4) Digital Delay Option (Refer Section 3).

HARDWARE OPTIONS - continued

5) Tail Defeat (Refer Dealer).

6) Local Telephone Set (Refer Section 3).

7) DTMF Microphones and Portable Acoustically Coupled Encoders.

EPROM SOFTWARE OPTIONS

1) The access code is normally the digit [*], but can be [*] plus a factory programmed three digit PIN plus [*] if required, or [*] plus a user programmed PIN plus [*] (Refer section 3).

2) The cycle timer for the alarm input may be ordered from 1 to 21 minutes; it is normally set for 1 minute.

3) If used for half duplex operation, TACT may be capable of "half privacy" depending on the type of repeater involved. An EPROM option is provided which controls the turning on of this feature as well as the method to accomplish it.

4) Steady-tone and steady-audio detection by the VOX may be disabled in order to send fax or data on a simplex system.

5) Default for number of delayed rings and all memory numbers can be programmed into the EPROM.

6) If TACT is to be used on an unmanned taxi two way radio base station, a "taxi" software option is available which reduces time-out on constant noise to 5 seconds, reduces operating tones sent to the field and masks all tones sent to the telephone party.

SEE ALSO APPENDIX D

SECTION 3

OPERATING INSTRUCTIONS

The following pages detail the operation of the TACT unit. These instructions vary, dependent upon three parameters:

1. Standard operations associated with a user programmable DIP switch located inside the TACT unit.

2. Operations associated with Software Options programmed into the EPROM at time of ordering.

3. Operations associated with the supply of Hardware Options.

   The following instructions cover all possible configurations.

SYSTEM OPERATING TONES

TACT provides several Operating Tones during a call and during programming. You should become familiar with these as they confirm all operating progress. They will also be referred to throughout this manual.

CONNECT TONE

A high/low tone (bee-boo) indicating that the system is ready to accept telephone digits or that an incoming call has been connected to line 1, and low/high indicating connection to line 2. (A short single connect tone is optional).

DISCONNECT TONE

Five "beeps" (fast busy) which indicates the disconnection of a telephone call in standard software, one beep for taxi software. (A short double disconnect tone is optional).

PROGRAMMING MODE TONE

"Mary had a little lamb" is heard when programming mode is activated.

PROGRAMMING SUCCESS TONE

"Waltzing Matilda" is heard upon successfully completing a programming sequence.

ERROR TONE

The sound of a "Siren" is heard (6 tones - hi,lo,hi,lo,hi,lo), indicating that an error was made in the programming sequence or an invalid code was received.

WARNING TONE

A series of seven loud, fast "beeps" indicates an impending time-out of a call in standard software, or two beeps for taxi software.

RING TONE LINE 1

A low/low tone is heard.

RING TONE LINE 2

A low/high/low/high tone is heard.

ALARM TONE

When the alarm input is activated, an alarm tone (high/low, high/low...) will sound for a 15 seconds.

REMOTE ON/OFF (Optional)

One long tone signifies that TACT is switched off. Two short tones indicates that TACT is on.

HOLD TONE

Two short tones repeated every 30 seconds indicates that a call has been placed on hold.

Line 1: Two short low tones.
Line 2: Two short high tones.

A shortened tone set is available, consult factory.

CONVERSING THROUGH TACT

Conversation through TACT to a telephone is very similar to a normal two way radio conversation.

DUPLEX OPERATION

1. TACT is interfaced to the system's base or repeater which is a two frequency system with separate transmit and receive frequencies.

2. The mobile user employs a press-to-talk operation and can gain the audio path at any time by simply keying his microphone.

SIMPLEX OPERATION

1. TACT is interfaced to a single frequency base station or to a dual frequency base station operating through a remote repeater, or to an RF control base triggering a repeater.

2. The mobile user employs a press-to-talk operation, listening for the squelch break as the cue to talk. Do not key mic until the squelch is heard and then key mic immediately. Ask the person on the phone to reply as soon as you release the mic, perhaps by saying "over". Another point to note is that if the person on the phone is pausing during speech, this may cause their voice to drop out. Keying the mic briefly will bring their voice back.

3. TACT monitors audio from the telephone network and will shut down transmission if:

    I. A minimum of five busy tones are received from the telephone exchange.

    II. Five seconds of continuous or modulated dial tone is received.

    III. Twenty seconds of continual audio or noise is detected in which case a warning tone is sent to the user. This allows the mobile to regain control of the audio path and to either restart all timers by keying the microphone, or to disconnect by pressing [#][#].

MAKING A TELEPHONE CALL

Using a press to talk operation and the DTMF pad of your handheld, mobile or local phone:

1. Key mic and press [*] on the DTMF keypad.
2. Release mic and wait for the Connect Tone to stop.
3. Key mic and enter the required telephone number, and then press [*] to send.
4. Listen for ring tone and answer of called party, then carry on with the conversation.
5. To disconnect the call, key mic and press [#][#]. Listen for Disconnect Tone.

NOTE:

- TACT will also disconnect if a call duration of 30 minutes is exceeded, or after a specified period of no mobile activity.
- For mobiles with 'store and send' type dialing, you may enter * nnnn... *, where nnnn... is the telephone number, and send the entire digit string in one go without listening for the Connect Tone (Step 2 above). You must ensure however that there is sufficient lead in delay (refer to your Radio Handbook) so that TACT is in receive mode before DTMF digits are transmitted from the radio.

MEMORY DIALLING

Memory dialling allows nine of the most frequently called numbers to be accessed by pressing only two keys.

To Store Memory Numbers:

1. Press [0] [*].
2. Listen for the programming mode tone.
3. Enter the number of the memory location ([1] to [9]).
4. Key in the required telephone number.
5. Press [*].
6. Listen for the programming success tone.

To Dial Memory Numbers:

1. Press [#].
2. Enter memory location (any one of [1] to [9]).
3. Listen for ring-tone and answer, carry on with conversation.
4. Disconnect by pressing [#][#].

LAST NUMBER REDIAL

1. Press [#] [0].
2. The last number dialled is automatically re-dialled.
3. Proceed with the call.

NOTE: The last number dialled is cleared if you receive an incoming call or if you are disconnected during dialling. If there is no number in the memory, error tone will sound.

ANSWERING AN INCOMING TELEPHONE CALL

There are several ways that TACT can handle an incoming call. The method depends upon your requirements, with your unit being set up accordingly at the time of installation.

IMMEDIATE RING, AUTO ANSWER

On receipt of incoming ring voltage, TACT responds by sending the Connect Tone to both called and calling parties. The caller may then voice-call any handheld or mobile in the system and carry on with the conversation.

IMMEDIATE RING, DELAYED AUTO ANSWER

On receipt of incoming ring voltage TACT responds by sending a user programmed number of simulated rings to the field to alert the user that a call has been received before performing the standard auto answer sequence. Refer to APPENDIX "B".

IMMEDIATE RING, MANUAL ANSWER

Upon receipt of incoming ring voltage, TACT sends simulated ring tone to the field. Manual answer allows any mobile in the system to answer the call by pressing [*], at which time TACT will send the Connect Tone.

DELAYED RING, MANUAL ANSWER

Ringing is ignored by TACT for a specified number of rings to allow a parallel extension or the Local Phone to answer the incoming call. The number of rings ignored is initially two, but is programmable by the end user to be one to ten rings.

If the call is intercepted by the extension, the TACT unit returns to idle state. If the call is not answered by the extension before the delayed ring period expires, TACT reverts to manual answer mode (ie. simulated ring tone is sent to the field).

DELAYED RING, AUTO ANSWER

Ringing is ignored by TACT for a specified number of rings to allow an extension or the Local Phone to answer the incoming call. The number of rings ignored is initially two, but is programmable by the end user to be one to ten rings.

If the call is intercepted by the extension, the TACT unit returns to idle state. If the call is not answered by the extension before the delayed ring period expires, TACT reverts to auto answer mode.

TWO LINE OPERATION AND HOLD FEATURE

TACT offers two line capability. This feature allows the field operator to either make or receive a call on line 1, and then to make or receive a call on line 2. If both lines are in use the field operator can switch from one line to the other via the Hold feature.

1. After making or receiving a call on line 1, it is possible to place it on hold by pressing [0] [1] and to then initiate a second call via line 2. Alternatively, if a call comes in on line 2 while line 1 is in use, TACT sends a Field Call Tone to all parties and the call may be answered by pressing [*], which automatically places the first call on hold.

2. It is now possible to switch between calls by pressing [0] [1].

3. To disconnect the call in progress, press [#][#] and the call on hold will automatically be returned. Note that the disconnect tone will not be heard until both calls have been disconnected.

REMOTE ON/OFF (Optional)

This feature disables and enables simulated ring tone being sent to air from calls on line 1. [0][#] toggles remote on/off. One long beep equals ring tone off, two short beeps equals ring tone on.

HOOK FLASH

This feature enables TACT to perform a hook flash when connected telephone system with this facility. It is activated by sending a DTMF 7 plus the extension number. The number of digits in the extension number must be programmed into TACT as well as the hook flash duration. Refer to APPENDIX "B".

DELAYED RINGING

You can program the number of rings to be ignored before TACT answers an incoming call. 2 rings is the factory preset. (Dip switch 5 must be off).

1. Enter [0] then [*] and wait for programming mode tone.
2. Enter [#].
3. Enter [1].
4. Enter a single digit from 1 to 9, or zero; for 1 to 9, or 10 delayed rings respectively.
5. Listen for programming success tone.

LONG DISTANCE CALLS

TACT can be set up to reject the leading zero (in PABX mode, TACT will reject the second zero) therefore preventing STD and IDD calls. (Dip switch 7 off = disable).

PABX MODE

Connecting TACT to a PABX extension is no problem. You can make both inside and outside calls. (Dip switch 8 is set to the off position).

When dialling outside numbers or programming outside numbers to the Memory list, simply enter the outside access code before the required number. TACT will dial the first ‘0’ and wait for the second dial tone.

TIME-OUT OPERATION

TACT has an automatic time-out in the absence of conversational traffic. You can program the length of the time-out period as follows:

1. Press [0] [*] to enter programming mode and listen for the programming mode tone.
2. Press [#].
3. Press [3].
4. Enter a single digit ([0] - [3]) to select one of the following timers:
   [0] = 1 minute on idle call/ 3 minutes on mobile transmitter lock up (preset).
   [1] = 5 minutes on idle call/ mobile transmitter lock up.
   [2] = 8 minutes on idle call/ mobile transmitter lock up.
   [3] = 15 minutes on idle call/ mobile transmitter lock up.
5. Listen for programming success tone.

NOTE: 15 seconds prior to time-out, TACT sends the warning tone to all parties. Keying the mic briefly will reset the timer. If you are timed out all parties will hear the disconnect tone.

PAGING OPTION

If TACT is equipped with the paging (selcall) option, pagers and/or mobiles and handhelds equipped with paging decoders may be selectively called from any DTMF telephone or mobile fitted with a DTMF pad.

This option is capable of encoding Two Tone Motorola and Five Tone Sequential protocols; either EIA, EEA, CCIR or ZVEI tone sets, and the required protocols must be specified at time of ordering.

To Initiate a Paging Call

1. Press paging call access generator code:
   [8] for two tone Motorola paging, or
   [9] for five tone sequential paging.
2. Press X... (Pager code number you wish to call)
3. Listen for completion of paging tones.
4. Proceed with voice message if desired.
5. Press [#][#] to disconnect (if calling through telephone network).

PROGRAMMING PERSONAL IDENTIFICATION NUMBER (P.I.N.)

TACT can be programmed to operate only after a PIN number has been entered. TACT leaves the factory with no PIN number in place. To enter a PIN number;

1. Enter [0] then [*] and wait for programming mode tone.
2. Enter [#]
3. Enter [7]
4. Enter 3 digit PIN, 3 times, ie. [4][5][6] [4][5][6] [4][5][6] (where 456 is required PIN).
5. Listen for programming success tone.

To change PIN at a later date:

Repeat steps 1 to 3 then
4. Enter [4][5][6] [1][2][3] [1][2][3] (where 456 is old PIN, and 123 is new PIN).

Where a PIN is in place, access to TACT will be by entering [*] followed by the PIN plus[*].

NOTE: If TACT is reset, the PIN will revert to the factory default.

ALARM INPUT OPTION

TACT may be ordered with an alarm input to which you can connect systems such as a security alarm, a door open alarm or a mains failure alarm.

When triggered, TACT sends a unique Warning Tone to all mobiles or dials the telephone number stored in memory position 1, every 1 minute until the alarm is reset.

AUXILIARY OUTPUT RELAY OPTION

An Output Control Relay may be built into TACT to which you can connect most switchable systems. Turn on and off external sirens, building security systems, power gates/doors etc.

To operate the output relay:

Press [0][4] - Turn auxiliary relay on.
Press [0][5] - Interrogate auxiliary relay.
Press [0][6] - Turn auxiliary relay off.

TACT will send two short beeps when the relay is on and one long beep when it is off.

TACT LOCAL PHONE - OPERATION INSTRUCTIONS

INTRODUCTION

The Local Phone for TACT is a purpose built telephone for use with TACT. It plugs into the local phone socket on the rear of TACT. It will NOT work with any other equipment or in any other socket of TACT. Nor will a normal telephone work in the LOCAL PHONE socket of TACT.

The interconnecting cable between TACT and the Local Phone is a 6-way cable, and utilises RJ-12 connectors on both ends of the cable. The standard cable length supplied with the Local Phone is 2 metres. Special length cables may be obtained on request.

The Local Phone may be used as a paging encoding terminal and as a terminal to contact field units. Incoming calls may be intercepted by the operator of the local phone and can be patched through to the field or put on hold. Phone calls may be made for, and patched through to the mobiles who do not have DTMF encoders.

Mobiles still have the option of dialling a number automatically when there is no one in the office to do this for them. This may be done without distracting the office staff from other duties. Mobiles can attract the attention of office staff by ringing the local phone by a special keypad sequence [0] [9]. Consequently office staff need not be distracted by normal traffic on the air.

LOCAL PHONE OPERATIONAL CONTROL CODES AND PROCEDURES

TALKING TO MOBILES

Talking to people in the field is simple - merely pick up the handset and talk. The switching of the transmitter (in a simplex system) is automatically done by the internal VOX inside TACT. When you are finished talking, you may hang up the handset.

RECEIVING A CALL FROM THE FIELD PARTY

If a mobile wishes to contact you, and has a DTMF encoder, he merely enters [0] [9] and the Local Phone will ring (once). If you pick up the phone, and hear no connect tone (bee-boo), then the call has emanated from the field, and you may wish to ask whether anyone was calling you (the base).

INCOMING CALL INTERCEPTION

An incoming call will ring the local phone, and will also ring out to the field. In this way either party may answer. To answer an incoming call with the local phone, merely pick up the handset. The connect tone will be heard and you may converse with the telephone party. Upon hanging up, the call will be terminated.

RINGING LEVEL

The loudness and pitch of the ringing may be adjusted for optimum audibility, or turned off.

PUTTING A CALL ON HOLD

If a telephone call has been intercepted by the Local Phone and a private conversation is required within the office, or with one of the mobiles, then pressing [0] [1] on the keypad will put the call on hold. This will be confirmed by TACT signalling two long beeps.

Taking the call off hold may be done by pressing [0] [0] - and TACT will confirm by playing the confirmation tone (‘Waltzing Matilda’). The conversation may proceed with the telephone party.

MAKING A TELEPHONE CALL & PATCHING A CALL TO THE FIELD

To make a call with the Local Phone, the same procedure as making a call from a mobile is required. This consists of picking up the handset, dialling a [*], waiting for TACT to respond, dialling the number required and dialling another [*] to execute the dial out.

Once a call is established, a mobile in the field may be brought into the conversation. The Local Phone may be hung up once the mobile has answered, if no further input is required, and a conversation between the mobile and telephone party may proceed.

SELECTIVE CALLING ENCODING

Selective calling (or paging) is done by picking the handset up, and dialling [9] xyz in the case of 5 tone selective calling, or [8] xyz in the case of 2 tone calling (where xyz is the particular mobile selective calling number required). In some cases more or less digits may be required to encode the mobile number.

Once the last number has been sent, the user should hear two short beeps to indicate the start of the selective call. On completion of the selective call, two further beeps may be heard. After these two beeps, speech from the Local Phone will be patched out to the field in the normal way.

OTHER CONTROLS

The TONE / PULSE switch at the base of the telephone must be switched to the TONE position.

The Tone and Flash buttons, and some other controls on the Local Phone are not used.

SUMMARY

Office to Mobile

1. Lift handset and talk
2. Replace handset to terminate conversation

Mobile to Office

1. Press [0] [9] to ring Local Phone. Listen for tone.
2. Wait for answer from Local Phone, then proceed with conversation.

Outgoing Telephone Calls

1. After lifting the handset, dial [*] number [*].
2. Replacing the handset will disconnect the call unless a mobile is on the call.

Incoming Telephone Calls

1. When you hear the electronic ringer, lift handset to take or join the call.
2. Replacing the handset will disconnect the call unless a mobile is on the call

DIGITAL DELAY OPTION

The purpose of the Digital Delay option is to improve VOX operation.

When VOX is used to key a transmitter, the delay in its operation may cause the radio user to miss the first syllable of the speech from the person on the telephone. If the speech to the transmitter can be delayed by at least the same amount, no loss of speech will occur.

The Digital Delay option is used to provide this function. The delay may be set in increments of 64 ms as shown in the following table.

Delay (ms)	Segment 1	Segment 2	Segment 3	Segment 4
64	On	On	On	Off
128	On	On	Off	On
192	On	On	Off	Off
256	On	Off	On	On
320	On	Off	On	Off
384	On	Off	Off	On
448	On	Off	Off	Off
512	Off	On	On	On
576	Off	On	On	Off
640	Off	On	Off	On
704	Off	On	Off	Off
768	Off	Off	On	On
832	Off	Off	On	Off
896	Off	Off	Off	On
960	Off	Off	Off	Off

Delay Time Selection

SECTION 4

TECHNICAL SPECIFICATIONS

POWER:	13.8 VDC NOMINALLY 750mA Note that the centre pin is positive

RADIO INTERFACE:

AUDIO IN:	50K ohm input impedance Optional speaker load Optional 600 ohm termination
AUDIO OUT:	600 ohm output impedance
LEVEL ADJUSTMENT:	RADIO TO LINE Automatic Level Controlled LINE TO RADIO -30dBm → +6dBm @ -10dBm Input

VOX CIRCUITRY (SIMPLEX MODE):

(References are temperature sensitive, automatic calibration performed every 15 minutes)

Attack Time:	20ms
Release Time:	20ms
Persistence Time:	700ms (Software Adjustable)

TRANSMITTER KEYING PTT:

Form C contact closure optional to provide ground or +12 volts on operation of relay (maximum source 50ma). Current limit resistor linkable.

CARRIER DETECT (COS):

Positive/negative carrier indication (strapping option) with a detection threshold of 0.7v/3.7v (strapable).
Input impedance greater than 100K ohm.
Tail defeat Option (for overcoming PTT persistence on community repeaters and trunked radio systems)

DTMF DETECT AND VERIFY:	> 50ms
DIALLING:	DTMF or DECADIC
MEMORY DIALLING LIST:	Nine 20 digit numbers
DECADIC INTERDIGIT PAUSE:	800ms
DECADIC MAKE/BREAK:	40/60
DECADIC DIALLING SPEED:	10 pps

FIELD SIGNALLING:

CONNECT:	*
DISCONNECT:	## (or #)
LAST NUMBER REDIAL:	#0
MEMORY DIALLING:	#N, where N= 1 → 9 (or 00 → 99) MEMORY LOCATIONS
PROGRAMMING MODE:	0*

TONES:

CONNECT:	HIGH/LOW (BEE/BOO) (SINGLE BEEP OPTIONAL)
DISCONNECT:	FIVE BEEPS (SINGLE BEEP OPTIONAL)
PROGRAMMING:	"MARY HAD A LITTLE LAMB"
PROGRAMMING SUCCESS:	"WALTZING MATILDA"
ERROR:	SIREN
WARNING:	LOUD RAPID BEEPS
HOLD (LINE 1):	TWO SHORT LOW TONES
HOLD (LINE 2):	TWO SHORT HIGH TONES
REMOTE ON/OFF:	OFF - ONE LONG TONE ON - TWO SHORT TONES
RING ON LINE ONE:	LOW/LOW
RING ON LINE TWO:	LOW/HIGH/LOW/HIGH

AUTOMATIC CIRCUITRY:

LOCKED UP MOBILE DETECT DISCONNECT:	3, 5, 8 OR 15 MINUTES
IDLE CALL DISCONNECT:	1, 5, 8 OR 15 MINUTES
FAR END HANG-UP DETECTION:	MINIMUM OF 5 BUSY TONES 200-600ms on/off period for standard busy tone. 300-700ms off period and 2300-2700ms on period for NU tone.

EXTERNAL INDICATORS:

POWER ON LED	LINE 1 CONNECT LED
TRANSMIT LED	LINE 2 CONNECT LED
RECEIVE LED	LINE 1 HOLD LED
AUXILIARY LED	LINE 2 HOLD LED
ALARM LED	LOCAL PHONE OFF HOOK LED

INTERNAL CONTROL/ADJUSTMENTS:

RADIO TO LINE GAIN
LINE TO RADIO LEVEL
TEST TONE LEVEL - FACTORY SET
12 VOLT SET - 2 FUSES
PAGING LEVEL (OPTION)
TAIL DEFEAT PERSISTENCE TIME (OPTION)
TAIL DEFEAT SENSITIVITY (OPTION)
VOX SENSITIVITY
SPAN ADJUSTMENT - FACTORY SET
OFFSET ADJUSTMENT - FACTORY SET

EXTERNAL CONNECTORS:

LINE 1 AND LINE 2 RJ12 TELEPHONE SOCKETS
BASE STATION 8 PIN DIN SOCKET
AUX AND ALARM 7 PIN DIN SOCKET (OPTION)
LOCAL PHONE 6 CONDUCTOR RJ12 SOCKET
CONCENTRIC POWER SOCKET
GROUND SCREW

DIPSWITCH OPTIONS

DIPSWITCH	OFF	ON
1	Diagnostic Mode	**Normal Operation**
2	**Simplex Mode**	Duplex Operation
3	Decadic Dialling	**Tone Dialling**
4	**Manual Answer-Line 1**	Auto Answer-Line 1
5	Delayed Ring	**Immediate Ring-Line 1**
6	**Manual Answer-Line2**	Auto Answer-Line 2
7	Disable STD & IDD	**Enable STD & IDD**
8	PABX Extension	**Direct Exchange Line**

GENERAL SPECIFICATIONS:

DIMENSIONS: TA 7 350mm WIDE X 240mm DEEP X 60mm @ BACK, 25mm @ FRONT

TA 7R 482.6mm WIDE X 240mm DEEP X 43.6mm HIGH

OPERATING TEMPERATURE: -20 → 70 °C

SECTION 5

INSTALLATION AND TESTING PROCEDURES

The procedure for installing TACT involves four steps:

1. Make all external connections.
2. Configure strapping options to match the particular application.
3. Configure the Dipswitch.
4. Set all levels according to the level setting procedure.

The following connections must be made between TACT and the base station or talk through repeater:

- Audio output from radio
- Audio input to radio
- Press to talk input to radio
- Carrier detect indication from radio (exception: tail defeat option ONLY)
- Power
- Ground

An installation diagram is provided for reference in Section 7, Drawings.

OPENING THE UNIT

To open TACT Model TA-7 remove the four screws located on the bottom of the unit and then remove the base plate.

Access to TACT Model TA-7R is gained by removing the four Philips screws that secure the top cover to the unit. The cover can then be lifted off. Do not remove any other screws.

AUDIO OUTPUT FROM RADIO

Audio output from the radio (300 → 500 mV. p-p recommended) is fed into TACT via Pin 2 of the DIN connector. The radio speaker output may be used as the audio source. A speaker load is available on Pin 7 if the radio speaker is disconnected. Link LK7 inside TACT may be strapped to lower the input impedance of the radio receive audio port to 600 Ohms. With LK7 removed, the input impedance is high (>100K).

To meet ACA specifications, the audio level from TACT to line should not exceed -6dBm. TACT is equipped with an AGC circuit. The radio being used should be adjusted so as to not exceed -6dBm to the line.

Generally this level will only need checking because of the nature of the AGC circuitry. However, if adjustment is required, the easiest method to achieve this calibration without expensive or additional equipment is as follows:

1. Switch TACT into diagnostic mode and transmit DTMF [5] from the mobile to TACT.
2. Make sure that the level from radio to TACT is less than 1V RMS.
3. Apply a DC loop current to line 2, similar to a ‘Telco’ line (600 ohms), or a connected telephone line. Place a dBm or AC volt meter across the line.
4. Transmit DTMF [5] and starting from fully anti-clockwise adjust potentiometer RV8 until output level reaches maximum; check that this level is around -6dBm or .775 V.

AUDIO INPUT TO RADIO (SETTING THE DEVIATION LEVEL)

The audio input to the radio is found on Pin 5 of the DIN connector. It can be connected to the radio's mic input or similar point. Potentiometer RV7 adjusts the audio level to radio for correct modulation. If using microphone sensitivity input, a 10:1 resistive voltage divider across the mic input circuit is recommended.

The level setting procedure is as follows:

1. With TACT in diagnostic mode transmit DTMF [2] from the mobile to TACT. TACT will respond by transmitting a DTMF [*] via the base station to the mobile for 30 seconds. Connect a deviation meter to the base station and adjust RV 7 so that the signal deviates the RF carrier 2.5kHz on systems with 25kHz channel spacing or 1.25kHz on systems with 12.5kHz channel spacing.

2. If a deviation meter is not available, adjust RV 7 to match the input specifications of the radio. eg. A radio may require 100 mV at its input or you may insert the audio as a mix with the radio's microphone at very low levels. Be sure level is correct or distortion may result.

PRESS TO TALK INPUT TO RADIO

A relay is provided to apply press to talk (PTT) to the radio in normal operation. If LK 11 is strapped, the normally open contacts of this relay will be connected to Pins 1 & 6 of the DIN connector. With LK 11 removed, the contacts will be connected to the same Pins through a 220 ohm current limiting resistor. Normally a radio will require a contact closure to ground or +12V to key the transmitter. This may be achieved by connecting Pin 6 to ground or + 12V as required and Pin 1 to the PTT input.

CARRIER DETECT INDICATION/CARRIER OPERATED SQUELCH (COS)

TACT requires an indication from the radio to decide whether or not the radio is receiving. This indication can be taken from the radio squelch circuitry or from the front panel BUSY light. In some instances, the radio carrier signal will require a voltage pull-up, and if so, strap LK 9.

The following table indicates the various strapping options related to the carrier detect circuit:

SIGNAL CONDITIONS	STRAPPING OPTION
3.7V Threshold	LK 10 2-3
0.7V Threshold	LK 10 1-2
Positive Logic	LK 12 1-2
(Signal above threshold when carrier present)	
Negative Logic	LK 12 2-3
(Signal below threshold when carrier present)	
COS Signal Input	LK 13 1-2
Tail Defeat option being used for COS	LK 13 2-3

POWER

Power to operate TACT is taken from the radio and connected to Pin 3 of the DIN connector. Alternatively, a separate power supply of 13.8 VDC 1A nominal can be connected to the POWER socket on the rear panel.

NOTE: Centre pin is positive.

GROUND

A signal ground from the radio is connected to Pin 8 of the DIN connector.

TELEPHONE LINE CONNECTION

TACT is connected to the analogue telephone line(s) via one or two line cords which are plugged into the modular sockets on the rear panel of TACT and into the Telephone sockets.

If using only a single telephone line, connect line 1 since this is the priority line for outgoing calls.

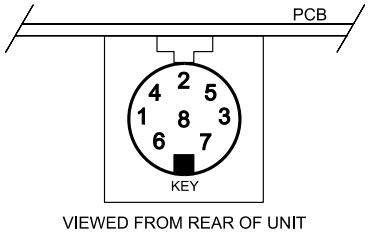
SETTING OF PAGING LEVEL (IF PAGING OPTION FITTED)

Press [3] and TACT will send a 1 kHz paging tone over the radio channel for 30 seconds. This tone is used for paging purposes; adjust RV 3 until the radio deviates the RF carrier 2.5kHz on systems with 25kHz channel spacing or 1.25kHz on systems with 12.5kHz channel spacing. Note that this adjustment must be made only after adjusting RV 7 as RV 7 has an effect on the paging level.

VOX

The VOX being under software control is set at the factory and should not require any field adjustment. However an internal sensitivity control is provided for more or less sensitivity. If it is suspected that it has been adjusted since factory calibration, refer to VOX CALIBRATION section or consult the factory.

DIN CONNECTORS



VIEWED FROM REAR OF UNIT

RADIO DIN CONNECTOR

PIN	DESCRIPTION
1	PTT+
2	Audio into TACT
3	+ 13.8 Vdc nom.
4	COS Carrier indication
5	Audio out from TACT
6	PTT-
7	Speaker Load 6 ohm
8	Signal Ground

AUXILIARY DIN CONNECTOR

PIN	DESCRIPTION
1	Contact set A, N/O
2	Alarm Input
3	Contact set B, N/O
4	Contact set A, N/C
5	Contact set B, centre pole
6	Contact set A, centre pole
7	Contact set B, N/C
8	Common (Ground)

INTERNAL LINKS

The following links are always strapped:

LK 19 1-2, LK 2 2-3, LK 2a 1-1

The following links should not be strapped:

LK3, LK4, LK5, LK14, LK15, LK16

(The above links are used during manufacture and factory tests only.)

LINK OPTIONS

Link Number	Factory Setting	Explanation	Other Setting	Explanation
1	2-3	Selects 128k EPROM	1-2	Selects 256k EPROM Not present with Issue 7 & later
19	1-2	Selects 256k EPROM	2-3	Selects 512k EPROM
2	2-3	Selects 24 pin 16k RAM	1-2	Selects 32k RAM
2a	1-1	Vss for 24 pin RAM	2-2	A13 for 28 pin RAM
			3-3	Selects 64k RAM
3	OC		1-2	Forces a reset
4	OC		1-2	Disables watchdog
5	OC		1-2	Forces NMI reset
6	OC		1-2	Local Phone termination
7	OC		1-2	Line in termination
8	OC		1-2	Enables paging option Not present with Issue 7 & later
9	1-2	COS I/P Pull-up	OC	COS left floating
9a	SC	Selects Remote Control	OC	Disables Remote Control
10	1-2	COS detect thresh 0.7V	2-3	COS detect thresh 3.7V
11	OC	Current limit for PTT(220 ohm)	1-2	PTT direct connection
12	1-2	Positive Logic on COS	2-3	Negative Logic on COS
13	1-2	Normal carrier detect	2-3	Tail Defeat setting
14-16	OC			
17	1-2	Line 1 CPC Activated	2-3	Line 1 CPC Deactivated
18	1-2	Line 2 CPC Activated	2-3	Line 2 CPC Deactivated
20	1-2	Link if no Digital Delay Option fitted. Must also link SK7/3,5.		

(OC = Open Circuit)
(SC = Short Circuit)

DIPSWITCH OPTIONS

The following options may be selected via the internal eight way dipswitch (factory presets are underlined):

DIPSWITCH	OFF	ON
1	Diagnostic Mode	<u>Normal Operation</u>
2	<u>Simplex Mode</u>	Duplex Operation
3	Decadic Dialling	<u>Tone Dialling</u>
4	<u>Manual Answer-Line 1</u>	Auto Answer-Line 1
5	Delayed Ring	<u>Immediate Ring-Line 1</u>
6	<u>Manual Answer-Line 2</u>	Auto Answer-Line 2
7	Disable STD & IDD	<u>Enable STD & IDD</u>
8	PABX Extension	<u>Direct Exchange Line</u>

1) Diagnostic/Normal (OFF/ON)

A technician may use "Diagnostic Mode" to:

- Set transmit and receive levels.
- Verify the operation of the electronic Voice Switch circuitry (VOX).
- Verify the operation of the DTMF encoder and decoder.
- Verify the operation of all external inputs.

2) Simplex/Duplex

The TACT unit can be connected to a dual frequency base-repeater or to a single frequency (simplex) base station.

3) Decadic/DTMF Dialling

The TACT unit can be optioned for either DTMF (tone) or decadic (pulse) signalling to the telephone network. If at all in doubt use decadic.

4) Manual/Auto Answer - Line 1

The auto answer position causes immediate answer of incoming calls on Line 1. Manual answer relays simulated ringing tone to the field and requires human intervention in the form of DTMF signalling to answer the call.

5) Delayed/Immediate Ringing

Delayed ringing allows a dispatcher to intercept an incoming call before field units are alerted.

6) Manual/Auto Answer - Line 2

The auto answer position causes immediate answer of incoming calls on Line 2. Manual answer relays simulated ringing tone to the field and requires human intervention to answer the call.

7) Disable/Enable STD IDD

Long distance calls may be restricted. The leading ‘0’ of an STD telephone number will cause the unit to give an error tone should STD be disabled.

8) PABX Extension/Exchange Line

The TACT unit can be optioned for connection to a PABX. In PABX mode, calls using a "trunk access code" (0) will be processed as outgoing. Calls not beginning with this code will be dialled as a local call within the PABX. The unit in operation dials the first ‘0’ to gain outside access, then waits for the exchange dial tone and dials the external number.

NON MASKABLE INTERRUPT

To ensure that the non-volatile RAM is not corrupted, it is advisable to initiate an NMI which is accomplished by shorting LK 5. This action will however clear all memories and pre-programmed features such as delayed number of rings etc..

POWER SUPPLY CHECKS

TACT utilises +5, +12 and +6V supply rails. To check the 5V rail, connect the GND lead of the CRO or meter to R120 and the active lead to the +ve side of C76. Power up TACT and if 5V is not present, power down immediately.

Check the 12V rail at the collector of Q6, which should be approximately 12V.

Last of all check the 6V rail at Pin 8 of U25.

TAIL DEFEAT OPTION

This option allows you to connect TACT to an RF control (trigger base) working via a talk-through repeater with a carrier 'tail'. Previously not possible from other manufacturers, this feature means you can have two-way radio / telephone interconnect when it is not possible to install TACT at the repeater site.

Essentially, in this configuration, TACT does not monitor COS detect from the radio side. Instead, a second VOX operates when speech is detected from the mobile user. Simplex mode is used, where the mobile user always LISTENS FOR THE SQUELCH BREAK AS THE CUE TO IMMEDIATELY PUSH TO TALK if he wants to be heard. Failure to observe this may cause the telephone user to miss the beginning of your sentence.

TECHNICAL & OPERATIONAL DIFFERENCES FROM STANDARD SIMPLEX CONFIGURATION

Normally when the mobile user releases his PTT, TACT forces the connection of line audio to the radio and keys the transmitter for a minimum of 1 second. If there is activity detected on the telephone line, the transmitter is keyed until the activity ceases, or a time-out occurs.

This situation is likely to cause a problem when TACT is installed at an RF control (trigger base) away from the repeater site. In this case, when the mobile releases his PTT, the repeater will continue to transmit a 'tail' for some time. The phone user, hearing no signal, will start to talk. However, the presence of a carrier and consequently a COS input to TACT, will inhibit the trigger base transmitter and the mobile will not hear the first part of the audio from line.

In addition, the interaction of these control signals, and the one second keying of the transmitter on loss of COS, can cause an oscillation between transmit and receive modes.

Obviously this is not acceptable. The solution is to use a VOX that monitors the audio from the mobile user, and gives this as a carrier indication to TACT. If the mobile user does not talk, the RADIO VOX will not be held up, except for the length of the repeater's receiver squelching system.

The problem of the oscillation is fixed by arranging that TACT not force the line audio to radio for one second, but use the receipt of valid audio from the line to key the transmitter. The disadvantage of this is that a syllable may be lost at the start of a sentence. The use of the Digital Delay option, see Section 3, will circumvent this problem.

CIRCUIT DESCRIPTION

The tail defeat circuit picks up the audio after the AGC and rectifies it with U31-1, then level shifts it into a comparator U31-3 which feeds a Schmitt trigger U32-4 whose output drives U32-3 low via diode D28. However, when it returns high it charges C84 via RV11 & R138 thus producing a delay up to 1.25 seconds (Adjustable via RV11). Input level to the tail defeat circuit is varied by adjusting RV10.

TAIL DEFEAT VOX SENSITIVITY POTENTIOMETER RV 10

Turning this potentiometer anti-clockwise will decrease the VOX sensitivity from Radio to Telephone. This adjustment is VERY CRITICAL (because it opposes the telephone VOX) but fortunately is a one time adjustment as radio levels do not vary to a large degree. This pot must be adjusted so that the Receive light on TACT illuminates only when the mobile user begins to talk. The Receive light must remain illuminated for the duration of the sentence and then go out about half a second after the mobile user stops speaking. This is the desired setting for all-round performance.

PERSISTENCE POTENTIOMETER RV 11

Turning this potentiometer clockwise increases the persistence time of audio from Radio to Line; adjustable 0 $\rightarrow$ 1 second. Optimum time is about 0.5 secs. ie. about half way

FITTING INSTRUCTIONS

Should be returned to factory for retrofit (newer models may be able to be field upgraded). This option may require extra hardware/software.

EPROM REPLACEMENT

Dealers may convert a tail defeat unit to a standard unit by EPROM replacement and link change.

Extract the old EPROM, and insert the new EPROM. When the unit is switched on for the first time, momentarily short out LK5 (below the 6802 microprocessor) to re-initialise the system. This will also wipe the nine memories on the TACT, which will have to be re-entered.

Change LK13 to 1-2 for normal carrier detect operation, and to 2-3 for tail defeat operation.

ALARM INPUT

An alarm input such as a relay closure is available via the auxiliary DIN connector on the rear panel. The external contact connects Pin 2 to 0V (Body of auxiliary connector)

SECTION 6

TROUBLE SHOOTING

TROUBLE-SHOOTING AND COMMON CONFIGURATION PROBLEMS

TACT DOES NOT SEIZE THE LINE AND DIAL AFTER THE FIRST [*]

TACT software first saves all the digits up, then loops the line and dials after the second [*] is entered. If you wait more than 5 seconds TACT will reset itself and give error tone. You may then retry accessing the unit, and dialling a number.

TACT DOES NOT DIAL THE NUMBER - DIAL TONE AFTER IT HAS DIALLED

Wrong sort of dialling selected (eg tone dialling on a decadic telephone line).

AUDIO IS HEARD FROM THE TELEPHONE ON THE RADIO BUT NOT VICE-VERSA

Check the carrier detect circuit is working properly. When you receive signal, the RECEIVE LED on TACT should light.

AUDIO IS HEARD ON PHONE FROM THE RADIO BUT NOT VICE-VERSA.

Check the carrier detect circuit is working properly. When there is no signal, the RECEIVE LED on TACT should NOT be on.

TACT DIALS OK, BUT IT DOESN'T CONNECT TO NETWORK.

TACT may dial out, but the socket it connects to may be incorrectly configured. Remember, TACT will plug into a standard line socket - if you plug in a normal phone and it works, then TACT should work.

Is the line socket inserted in LINE 1, NOT LINE 2 or Local Phone socket?

Remember, TACT has pins 2 and 6 as connection points on the 605 Plug.

TACT DOES NOT DIAL OUT

Are you dialling [*] number [*] ? (tone dialling is not repeated to air)

Audio from the receiver not getting to TACT unit. Check LED2 - should modulate with audio, and glow brightly with DTMF. Audio should come in on pin 2 of SK4 (radio connector). If it does come in on pin 2, make sure the transmitter input circuit is not loading it down by removing LK9a (between radio connector & relay). See radio interface schematic.

DTMF levels are too high, causing DTMF tone distortion. Reduce DTMF deviation level. Listen on the receiver - bring the tone level up slowly, and you may hear distortion of the tones. Reduce output level when this happens.

WHEN TACT IS PLUGGED IN, THE AUDIO IS REDUCED OR AUDIO DISTORTED

If you are not using TACT as a two wire remote control, then remove link 9a (between the PTT relay and the RADIO DIN connector). The transmitter input circuit may be loading down the receive audio output.

Is the audio terminated by the terminating resistor? Check that LK7 is out (no termination).

HOW DO I ANSWER CALLS INSTEAD OF HAVING THEM GO TO THE RADIO?

You can intercept normal telephone calls with the LOCAL PHONE (a special 4 wire telephone - normal phones not compatible). This is available from Design Two Thousand Pty Ltd.

You can also put a normal telephone in parallel with TACT by putting a double adaptor on the phone socket (make sure its a double adaptor and not a mode socket). You can stop calls going immediately to the field by putting DIPSWITCH 5 to the off position - ie delayed ringing. The number of rings before the call goes to the radio is programmable from 1 to 10.

TACT OSCILLATES BETWEEN TRANSMIT AND RECEIVE DURING LONG PAUSES IN AN ESTABLISHED CALL

TACT, in a normal simplex configuration, uses the carrier detect signal (COS) to establish whether or not the radio is receiving a valid signal. When PTT is released by the mobile operator, COS goes inactive and the TACT Receive LED extinguishes. When this happens, TACT keys the radio transmitter for a minimum of one second so that the system is transmitting for when the telephone user begins to speak. If the signal (voice) on the telephone continues, then the VOX will keep the transmitter up. If however, there is no signal, TACT will de-key the transmitter after one second.

Should the radio link include a repeater (where TACT is connected to an RF control (trigger) base) and TACT de-keys the trigger base transmitter, the repeater transmitter in the return path (ie TACT's receive input) may continue to generate COS for a set time. This is referred to as a 'Tail'. This tail will give TACT a valid COS signal, which, when it terminates, causes TACT to re-key the trigger base transmitter. This may cause the TACT/radio/repeater system to oscillate between transmit and receive with a period equal to one second plus the repeater tail length.

TACT has a safeguard against this. It ignores the COS signal for a period of 420ms after it has de-keyed the transmitter. If COS exceeds this, then it is regarded as valid.

Therefore, if the repeater tail exceeds 420ms, the oscillation problem will occur.

One solution to this problem is to reduce the length of the repeater tail. If this cannot be reduced far enough, then a second solution available is to re-program TACT for a longer tail ignore time. (Note that the tail ignore time must encompass all delays from the time TACT de-keys the transmitter to the time the receiver COS goes inactive). This includes the repeater tail length, plus any delays in the radio path).

If these times are reduced to a minimum then the turnaround time (from telephone to radio) is reduced to a minimum. This makes the conversation closer to that of a normal telephone call.

TACT Rx & Tx ACTS ERRATICALLY AFTER CONNECTION TO RADIO

Carrier Operated Squelch (COS) is the most reliable way of interfacing TACT with a simplex radio and should be employed where ever possible. The following explanation will assist in getting the interface to work correctly.

There are two basic modes of operation. The first is where the radio provides a voltage to indicate whether or not it is currently receiving a carrier and the other is where this condition is indicated by a contact closure. In the first case, a voltage may indicate the presence of a carrier OR its absence, and in the second case a closure may also indicate either the presence OR absence of a carrier.

If TACT is not responding to a carrier being received by the base radio, or is responding improperly, proceed as follows. Remove link LK9 and prepare to measure volts between LK9/2 and ground while the radio is and is not receiving carrier, and note the results. If there is no voltage in either condition, repeat the test but this time, measure resistance. If there is again no change, either the radio is faulty or wrongly configured, or the cable connecting them is faulty. In the first instance, consult your radio documentation, (some radios for example, will not provide a COS output unless explicitly programmed to do so.). In the second instance, check the cable, particularly for continuity of the wires connected to pins 4 and 8 of the connector on the TACT end.

Where a voltage is found, and LK10/1-2 is made, then that voltage must be at least 0.8V; if 2-3 is made then it must be at least 4V. In practice, since the resistances are large, 1-2 can be made for any reasonable voltage ie less than 16V, and LK9/1-2 can be made or open providing the source resistance is ‘low’. Note also that the low voltage condition should be close to zero.

Where a resistance change is found, LK10/1-2 must be made, and the resistance must fall from about 240k to less than 37k. After the resistance measurements have been made, LK9/1-2 must be made for the circuit to function.
Finally, ensure COS/Tail Defeat is set to COS with LK13/1-2 made. In this condition, if the Receive LED on TACT does not light when carrier is present and extinguish when carrier is not present, check LK12. For voltage present on carrier detected, make 1-2, and for low resistance (contact closure) make 2-3.

APPENDIX A

OPERATING PROCEDURES

AUXILIARY RELAY

[0][4] - AUXILIARY RELAY ON
[0][5] - AUXILIARY RELAY INTERROGATE
[0][6] - AUXILIARY RELAY OFF

When the relay is on TACT will send two short beeps and one long beep when it is off.

PIN NUMBER OPERATION

When a PIN number is active in TACT the PIN number must be entered before every command sent to the TACT.

eg. PIN=123

ANSWERING A CALL	[*][1][2][3][*] (bee-boo)
DIALLING	[*][1][2][3][*] (bee-boo) [*] (bee-boo) number [*]
PROGRAMMING	[*][1][2][3][*] (bee-boo) [0][*]
REDIAL	[*][1][2][3][*] (bee-boo) [#][0]
etc.	

EASY PIN ACCESS

TACT may be factory programmed for ‘Easy PIN Access’. When a PIN number is programmed in the TACT EPROM, the PIN number must be entered only before certain commands sent to TACT.

eg. PIN=7

ANSWERING A CALL	[*] (bee-boo) - ‘Quick Answer’
DIALLING	[*][7][*] (bee-boo) number [*]
PROGRAMMING	[*][7] [0][*]...
REDIAL	[*][7] [#][0]
etc.	

APPENDIX B

PROGRAMMING OPTIONS

New programming features for TACT are now available for the user, so that they can tailor the system to their specific requirements.

DELAYED AUTO ANSWER

You can program TACT so that in auto answer mode it will either connect as soon as it detects ring current (no simulated ring to air) or send 1-5 simulated ring tones to air before answering the incoming call.

1. Enter [0] then [*] and wait for programming mode tone.
2. Enter [#].
3. Enter [4].
4. Enter a single digit value (0,1-5); for no delay, or 1 to 5 simulated rings to air respectively.
5. Listen for programming success tone.

Default: No delay

DIAL TONE DELAY

You can program the time that TACT waits for dial tone before it dials.

1. Enter [0] then [*] and wait for programming mode tone.
2. Enter [#].
3. Enter [5].
4. Enter a single digit value (0,1-9); for a delay of ten seconds, or 1-9 seconds respectively.
5. Listen for programming success tone.

Default: 3 seconds

AUXILIARY RELAY RESET ON DISCONNECT

TACT can be programmed so that on disconnection of a phone call the AUXILIARY relay is reset. This is provided so that you can switch external devices such as CTCSS during a call and have them return to the default state automatically when the call is completed.

1. Enter [0] then [*] and wait for programming mode tone.
2. Enter [#].
3. Enter [6].
4. Enter a single digit value (0,1) to turn this option off or on respectively.
5. Listen for programming success tone.

Default: Off

HOOK FLASH

You can now modify the hook flash parameters via the programming mode.

1. Enter [0] then [*] and wait for programming mode tone.
2. Enter [#].
3. Enter [8].
4. Enter a two digit value (00-99)
   nn = Hook flash time in ms/20
5. Enter a single digit value (0,1-9) for the number of digits that are required to be dialed after the hook flash.
   0 = Hook flash disabled.
6. Listen for programming success tone.

Default: Disabled

VOX HANG TIME

The VOX hang time is programmable. This is ideal when setting up the TACT with the Digital Delay option.

1. Enter [0] then [*] and wait for programming mode tone.
2. Enter [#].
3. Enter [9].
4. Enter a two digit value (00-63)
   nn = VOX hang time in ms/20
5. Listen for programming success tone.

Default: 35 = 700ms

PRIORITY OUT DIAL LINE

This feature allows you to enable either line 1 or line 2 as your priority out dial line.

1. Enter [0] then [*] and wait for programming mode tone.
2. Enter [#].
3. Enter [*].
4. Enter [1] for line 1 as priority or [2] for line 2 as priority.
5. Listen for programming success tone.

Default: Line 1

PABX OUT DIAL DIGIT

You can program the PABX out dial digit to suit your PABX.

1. Enter [0] then [*] and wait for programming mode tone.
2. Enter [#].
3. Enter [#].
4. Enter a single digit (0;1-9); This digit is the PABX out dial digit.
5. Listen for programming success tone.

Default: 0

APPENDIX C

MAKING A TELEPHONE CALL

For mobiles with ‘store and send’ type dialing, you may enter * nnnn... *, where nnnn... is the telephone number, and send the entire digit string in one go without listening for the Connect Tone. You must ensure however that there is sufficient lead in delay (refer to your Radio Handbook) so that TACT is in receive mode before DTMF digits are transmitted from the radio.

APPENDIX D

TACT TA-7 ENHANCED SOFTWARE OPTIONS

YOU MAY CHOOSE FROM THE FOLLOWING EPROM OPTIONS AT A NOMINAL CHARGE

MODE OF OPERATION

1. Standard (Simplex/Half Duplex)
2. Simplex Tail Defeat
3. Simplex/Full Duplex

Enter number of choice ____.

SYSTEM TIMERS

1. Standard (Long)
2. Taxi (Short)

Enter number of choice ____.

OPERATING TONES (not including alarm tone).

1. Standard (Long)
2. Short (Short)

Enter number of choice ____.

ALARM TONE

1. Long
2. Short

Enter number of choice ____.

CONNECT TONE

1. Standard Connect Tones (bee-boo)
2. No Connect Tones
3. Single Beep Connect Tones

Enter number of choice ____.

DISCONNECT CODE

1. Double Hash
2. Single Hash

Enter number of choice ____.

Aux Relay Switch On Ring Detect
If Line 1 Rings then Aux Relay is Turned Off
If Line 2 Rings then Aux Relay is Turned On

1 No Aux Relay Switching On Ring Detect
2. Aux Relay Switched on Ring Detect
Enter number of choice ____.

Beep To Line When COS Drops
Sends a short pip to line so the phone party knows that it is clear to speak.

1. NO Beep To Line
2. Beep To Line
Enter number of choice ____.

Beep To Air When VOX Drops
Sends a short pip to air so the mobile operator knows that it is clear to speak.

1. NO Beep to Air
2. Beep To Air
Enter number of choice ____.

Please Enter EPROM PIN number (0-999) _____. (None if not required).

Easy PIN Access y / n (Please circle as appropriate)
Used for normal PIN access or selecting the required TACT when multiple TACTs are in radio range.
ie. dial * <PIN>... for access.

1. Normal PIN access
2. Multiple TACTs
Enter number of choice ____.

Quick PIN Answer y / n (Please circle as appropriate)

1. Long (* <PIN> *)
2. Quick (* only)
Enter number of choice ____.

PAGING REQUIRED y / n (Please circle as appropriate)

Motorola 2 tone paging y / n
Which Paging Plan: - default is 16 = "S - Plan"

0.	General Encoding Format	11.	M - Plan
1.	B - Plan	12.	N - Plan
2.	C - Plan	13.	O - Plan
3.	D - Plan	14.	P - Plan
4.	E - Plan	15.	R - Plan
5.	F - Plan	16.	S - Plan
6.	G - Plan	17.	T - Plan
7.	H - Plan	18.	U - Plan
8.	J - Plan	19.	V - Plan
9.	K - Plan	20.	W - Plan
10.	L - Plan	Enter number of choice ____.	

Any Pre-coded Digits to be pre-coded ? (3 Digits Maximum)
eg 123, 12, 1 or none.
Default is no pre-coded digits. Enter choice _____.

---

5 Tone paging y / n
Which Tone Set - (1-6).
1. CCIR
2. EIA
3. EEA
4. ZVEI-1
5. ZVEI-2
6. ZVEI-3
Default value is 1 = CCIR tone set. Enter number of choice ____.

Any Pre-coded Digits - 5 digits maximum.
eg 12345, 1234, 123, 12, 1 or none.
Default is no pre-coded digits. Enter choice: _____.

Please enter :
Lead In Delay (ms).
Range 0 to 3200
Default is 500ms. Enter choice: _____.

Preamble tone (1-9).
Default is tone 1. Enter choice ____.

Please enter
preamble length (ms).
Range 0 to 3200
Default is 0. Enter choice _____.

Please enter :
Silence Gap (ms).
Range 0 to 3200
Default is 0. Enter choice _____.

Please enter :
Digit Tone Period (ms).
Range 20 to 3200
Default is 40. Enter choice _____.

Disable standard dialing out function ? y / n (Please circle as appropriate)
If this option is enabled, user is only able to dial memory numbers.
Default is no. ie. standard dialing enabled.

Continuous connection with automatic redial ? y / n (Please circle as appropriate)
This option selects alarm dial memory 1, 24 hr mode and requires hardware mod.: SK5/2 to U4/2
Default is no

Disable the COS timer (for 24 hour software) ? y / n (Please circle as appropriate)
Default is no. ie. COS timer enabled

DECADIC DIALLING MODE

Please choose from:
1. Standard Australian dialling (DEFAULT)
2. New Zealand (inverted decadic) dialling

Enter number of choice ____.

Enable dialling # (rather than using # to cancel) y / n (Please circle as appropriate)
Default is no. ie. dialling hash is disabled

Alarm Auto Dial memory 1 y / n (Please circle as appropriate)
Default is no. ie. audible tone to air (normal alarm warning tone enabled)

Change Repeater Tail Ignore Time from 420ms ? y / n (Please circle as appropriate)
Choose from 0 - 1200 ms _____.

FAX operation ? y / n (Please circle as appropriate)
Default is no. ie. fax operation disabled

Change Maximum Call Timers from 30 min ? y / n (Please circle as appropriate)
Default is 30 minutes. Choose from 1 - 255 mins _____, or 0 = 24 hrs.

Do you wish to have a pre-answer delay eg parallel answering machine systems ? y / n
(Please circle as appropriate)

Change Alarm Cycle Time from 1 mins ? y / n (Please circle as appropriate)
How many minutes ____.

List of barred numbers:
Is access to specified phone numbers to be barred y / n (Please indicate as appropriate)

List barred numbers

_____

_____

_____

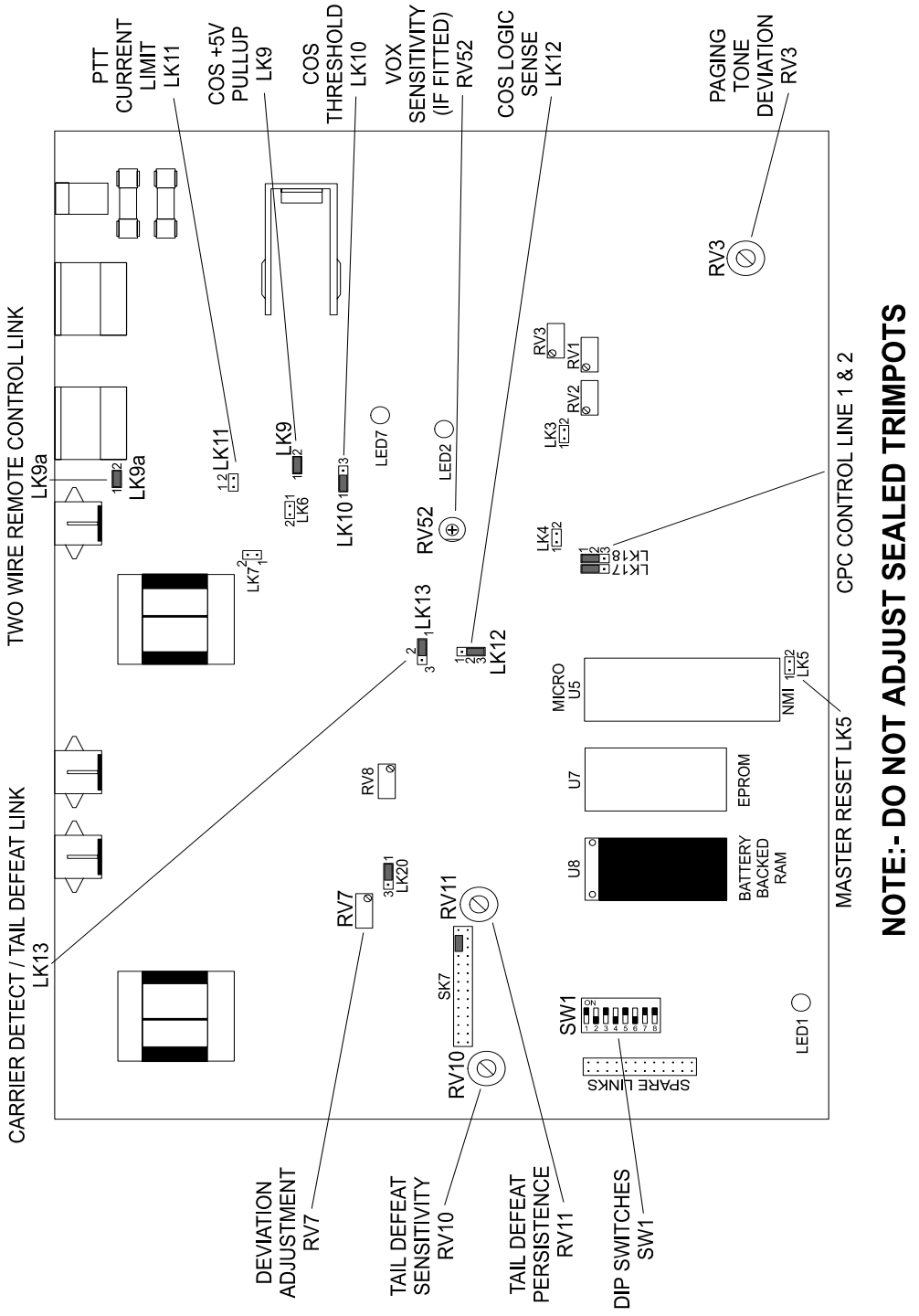
_____

_____

DO YOU WISH TO PROCEED WITH PRODUCTION OF THIS EPROM (y / n) ?

APPENDIX E

LINK & POTENTIOMETER POSITIONS



APPENDIX F

NINE OR NINETY NINE MEMORY DIAL NUMBERS

TO PROGRAM TACT FOR EITHER 9 OR 99 MEMORY DIAL NUMBERS

TACT may be user programmed for either nine or ninety nine memory dial numbers. (The factory default is nine numbers as this suits most applications and also involves less ‘key strokes’).

1. Press [0] [*].
2. Listen for the programming mode tone.
3. Enter [#][0][1] for nine memory dial number capacity, or
   Enter [#][0][2] for ninety nine memory dial number capacity.
4. Listen for programming mode success tone.

99 MEMORY DIALLING

Memory dialling allows ninety nine of the most frequently called numbers to be accessed by pressing only three keys.

To Store Memory Numbers:

1. Press [0] [*].
2. Listen for the programming mode tone.
3. Enter the number of the memory location ([0][1] to [9][9]).
4. Key in the required telephone number.
5. Press [*].
6. Listen for the programming success tone.

To Dial Memory Numbers:

1. Press [#].
2. Enter memory location (any one of [0][1] to [9][9]).
3. Listen for ring-tone and answer, carry on with conversation.
4. Disconnect by pressing [#][#].

Last Number Redial:

1. Press [#][0][0].

TACT MODEL TA-7

Designed and Manufactured By:

DESIGN TWO THOUSAND PTY LTD

9-11 ROSE STREET

UPPER FERNTREE GULLY

MELBOURNE 3156

Telephone: (03) 9758 5933 Facsimile: (03) 9758 5560
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DESIGN TWO THOUSAND PTY LTD IS CERTIFIED TO ISO9001

ACA SUPPLIER'S CODE: N468

ADDENDUM

TACT TA-7 PAGING ACTIVATION SYSTEM FOR NSW SES

OPERATING INSTRUCTIONS

ACCESSING TACT FROM TELEPHONE

1. Dial the telephone number assigned to TACT.
2. Wait for connect tone.

Note: At this point in time you are NOT interconnected to mobiles.

ACTIVATING THE PAGER

1. Enter DTMF Access Code 737 (SES).
2. Listen for two beeps that indicate that paging is about to be initiated.
3. Listen for another two beeps as confirmation that paging tones have been sent.

Note:
At this point you are NOT interconnected to mobiles and if a voice call is NOT required, simply press # # and hang up to end the session. TACT will also automatically time-out after approximately 10-20 seconds if no further code is entered. If a voice call IS required then:

TO MAKE A VOICE CALL TO MOBILES

1. After paging as described above, simply press 9, listen for the connect tone, and radio interconnect is established.
2. To end the call, press # # and hang up.

Note 1:
The TACT will also clear down automatically when the caller hangs up and busy tone is detected. It will also automatically clear after a preset time of ‘idle’ or Rx lock up.

Peter Zeug
Design Two Thousand Pty Ltd
August 22, 1996

Our Ref: SCN 127

TACT TA-7

ADDENDUM

MANUAL PATCH FACILITY

The Manual Patch Facility allows for manual connection of telephone calls to radios on Line 1 of TACT, and normal automatic operation on Line 2.

The Manual Patch is ideally suited for situations where field radios do not have DTMF dialling capability. The base radio operator using the Line 1 Manual Patch button on the front of the TACT unit performs the patching of telephone calls to radios and radio calls to the telephone.

OPERATING PROCEDURE

To Manually Patch a Telephone Call to a Radio

1. Establish a telephone call (incoming or outbound) using a telephone connected in parallel with Line 1 of TACT.
2. Call the required radio, wait for answer, and announce the call.
3. Press the Manual Patch button on the TACT panel to connect the call, then hang up telephone and replace mic in cradle.

To Manually Patch a Radio Call to a Telephone Number

1. Receive a radio call requesting you to patch you through to a nominated number.
2. Dial the nominated telephone number using a telephone connected in parallel with Line 1 of TACT and wait for answer.
3. Press the Manual Patch button on the TACT keypad to connect the call, then hang up telephone and replace mic in cradle.

TACT TA-7

ADDENDUM

D2K REF.: SCN 199 (QANTAS)

MANUAL DISCONNECT

To manually disconnect a TACT call, simply key mic (PTT) and press [0]. The telephone party can also disconnect the call by pressing [0]. (Please note that [#] [#] from the radio or telephone will also disconnect a call).

OTHER PROGRAMMING OR OPERATING CODE CHANGES

Essentially all programming or operating codes that begin with [0] now begin with [3] instead. These are:

Programming Mode:	[3] [*]
Aux. Relay On:	[3] [4]
Check Aux. Relay:	[3] [5]
Aux. Relay Off:	[3] [6]
Call On Hold:	[3] [1]
Call Off Hold:	[3] [0]
Alternate between two calls:	[3] [1]
Ring Local Phone:	[3] [9]

All other programming and operating codes and procedures remain as detailed in the TACT Operator Manual G/94060.

TACT TA-7T

ADDENDUM

D2K REF.: SCN 211 (NRE)

Pre Voice Prompt Delay

The department of NRE TACT TA-7T software allows radio users that are familiar with the system to enter the required telephone number before the voice prompt begins. This allows experienced radio users to set up a telephone call more quickly.

The voice prompt is:

“Welcome to the NRE Office".
"While holding down the press to talk button,
for the switchboard operator enter hash then one,
for the fire duty officer enter hash then two, or
enter telephone number followed by hash".

TACT now answers with a ‘pip’ tone and then waits for five seconds (default) for the radio operator to begin dialling. If the radio operator does not begin dialling within the delay time, the voice prompt starts playing and the radio operator will need to wait until it has finished before dialling can commence.

The delay before the voice prompt begins is programmable as follows:

Press * 74 nn #, where nn = 00 - 15 seconds (default = 05).

ADDENDUM

TACT TA-7 TELEPHONE PIN ACCESS

OPERATING INSTRUCTIONS

ACCESSING TACT FROM TELEPHONE

1. Dial the telephone number assigned to TACT.
2. Listen for the ring tone to stop.

Note 1: At this point in time you are NOT interconnected to mobiles.

ENTERING THE PIN AND CONNECTING TO RADIOS

3. Enter the four digit PIN.
4. Listen for the connect tone ‘bee-boo’.

Note 2:

At this point you are interconnected to mobiles and if a voice call is NOT required, simply press # # and hang up to end the session. TACT will also automatically time-out after approximately 30 seconds if no further activity is detected. If a voice call IS required then:

TO MAKE A VOICE CALL TO MOBILES

5. Simply voice page the required party.
6. To end the call, press # # and hang up.

Note 3:

The TACT will also clear down automatically when the caller hangs up and busy tone is detected. It will also automatically clear after a preset time of ‘idle’ or Rx lock up.

Peter Zeug
Design Two Thousand Pty Ltd
May 5, 2000

Our Ref: SCN 275