T700 PROGRAMMING SOFTWARE

PGM700 Version 3.05

USER'S GUIDE

TAIT ELECTRONICS LTD.
CHRISTCHURCH,
NEW ZEALAND.

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Chapter 1

1   <u>**Introduction**</u>

1.1   **PGM700 Package**

PGM700 is a comprehensive software package designed to allow easy programming of TAIT T700 series mobile radios.

The radio models supported by PGM700 are:

Type	Frequency Band
T720	66-88 MHz
T730	I36-174 MHz
T750	400-520 MHz

The menu driven environment is easy to use and offers great flexibility to the user. Moving between menus and within menus using the cursor keys is simple. Help information is available at every step if required.

1.2   **Features of PGM700 Version 3.05**

PGM700 version 3.05 includes all the features that were introduced in version 3.02, along with a new screen for the Low Current Repeater option.

The key PGM700 features are outlined below:-

 *   Full support for different display adaptors. Automatic detection of colour or monochrome adaptors and user configurable colours.

 *   Faster data entry with full cursor control when editing and automatic simplex entries for new channels.

 *   Programming of voting and scan groups. Up to I6 scan or voting groups can be defined.

 *   Programming of radio options. Options such as hookswitch monitoring, BCD channel selection and status functions are easily programmed.

 *   Memory key storage. Memory keys can be programmed to channels, groups or selective calling identity numbers. The keys can also be write protected so they cannot be erased by the user.

* Channel Access. Permitting the user to access channels and define their own scan groups can easily be programmed.

* Selective calling programming. All parameters and options for the Tait T700-30 signalling package can be programmed.

* Low current repeater programming. Enables you to set how the radio operates in low current repeater mode.

    NOTE: The data files produced by earlier versions are still compatible with PGM700 Version 3.05.

    To be able to utilize all the new features that PGM700 offers, you will need a radio that carries Version 3 software or later.

1.3   **Requirements**

    The basic requirements to use PGM700 are:

* IBM PC, XT, AT or true IBM compatible computer.

* 256 Kbytes of RAM.

* DOS version 3.0 or higher.

* Any 80-column monitor (monochrome, colour, LCD or Plasma).

* One floppy disk drive, although a hard disk with a floppy drive is recommended.

* A radio programming lead.

    To take full advantage of PGM700's features, a printer is also recommended.

1.4   **Typographic conventions**

All typefaces used in this manual have the following uses:

< >   Angle brackets in text or on DOS command lines show the KEY to push. TEXT of this sort should not be typed verbatim.

___   Underline represents text you must type (such as command-line).

" "   Double quotes represent text as it appears on screen.

Chapter 2

2   __Before you Start__

2.1   **Making a Backup**

The original PGM700 program disk is formatted for
double-sided, double-density disk drive and can be
read by IBM PCs and close compatibles.

You should make a complete working copy of the
original PGM700 program disk, then store the
original disk in a safe place. Your computer's DOS
manual will explain how to use the disk copy command
supplied with your computer.

2.2   **Installing PGM700**

Your PGM700 disk contains all the programs necessary
to program your T700 radios.

2.2.1   **Installing PGM700 on a hard disk**

If you wish to install PGM700 and its
support programs onto your hard disk (e.g.
drive C), the following steps can be used,
otherwise go straight to section 2.3:

Step 1:   Have the DOS prompt for your hard
disk on the screen e.g. "C:>" or
type c: <ENTER>

Step 2:   Change into the root directory by
typing cd\ <ENTER> at the DOS
prompt. Create a new subdirectory
by typing md T700 <ENTER> and go
into the subdirectory by typing
cd T700 <ENTER>

Step 3:   Put your floppy disk carrying the
programming software in floppy
drive A and type:
copy a:PGM700*.* <ENTER>
and you should have at least two
files copied across namely
"PGM700.EXE" and "PGM700CF.EXE".

Step 4:   Remove the floppy disk and store it
in a safe place.

2.3   **Setting up PGM700**

The colours used by PGM700 are user configurable.
The default colours are set to black and white, so
that PGM700 can be used on monochrome, colour, LCD
or plasma screen of your computer.

If you have difficulty reading text or dislike the colours used by PGM700, you can use the configuration program (PGM700CF) to change the colours. (See Appendix A for instructions).

Chapter 3

3   **Getting Started**

3.1   **A short example**

Now you have installed PGM700 on your system, you
are ready to start programming. At this point, it
is appropriate to find out a few basics, for
instance: how to start PGM700, how to enter data,
how to save the data and how to use PGM700 to
program a radio with the entered data.

Brief explanations on how to use PGM700 to perform a
simple example will be given. For a comprehensive
explanation of the whole PGM700 menu system, please
refer to chapter 4 of this guide.

3.1.1   **To start PGM700**

To start the PGM700 program, follow the
directions below:

To start PGM700 from a floppy diskette:

Step 1:   Have the DOS prompt for drive A on
the screen and put the PGM700
program disk (working copy) in
drive A.

Step 2:   Type the following commands

A: PGM700 <ENTER>

To start PGM700 from a hard disk:

Step 1:   After the DOS prompt type
cd T700 <ENTER>
to change to the correct
sub-directory, then type PGM700
<ENTER> to start the program.

When it starts up, PGM700 looks for
a file called PGM700.CNF in the
current directory. This file
contains the screen display colours
which PGM700 will use. If the file
is not found, PGM700 will use its
default colours. When you are
working on a particular monitor, it
is useful to have a copy of
PGM700.CNF which contains the
colours that suit your personal
preference.

Note: PGM700 will use the colours
defined in the PGM700.CNF
regardless of the colour adapter
used in your computer. In other
words, if you have difficulty
reading the text on the screen, it
is likely that the PGM700.CNF in
your current directory was
configured for a different display
adapter. In this case, you could
just exit from PGM700, delete
PGM700.CNF and restart PGM700. It
should now default to black and
white only.

After starting the program, the title screen will be
displayed. It shows the version number, date and
copyright information for the software. Pressing any key will cause
the main menu bar of PGM700 to appear as shown in Figure 1.0.
You are now set to go.

```
+---------------------------------------------+
|                                             |
|           T700 Radio Programmer             |
|                                             |
|                                             |
|                                             |
|         Version 3.05     08-Nov-1994        |
|                                             |
|                                             |
|                                             |
|         Copyright by Tait Electronics Ltd.  |
|                                             |
|         Christchurch, New Zealand           |
|                                             |
+---------------------------------------------+
```
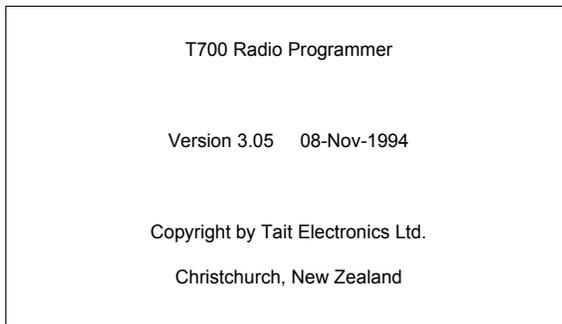
```
+---------------------------------------------+
|              .. press any key ..            |
+---------------------------------------------+
```

Figure 1.0   Title page of PGM700

Disk   Radio   Edit   Utility   Quit

```
load a file
save a file
```

Figure 2.0   Main menu of PGM700

Information required

The remaining sections of this chapter will
provide a step by step demonstration of how
to use PGM700. This encompasses:

- how to enter data
- how to save data in a file
- how to load an existing data file
- how to program a radio

The following information is supplied to
program a T750 radio:

Radio model	T750
Synthesiser reference frequency	I0 kHz
Control head	Standard
Transmit timer	50 sec.
No. of channels	3

The Selcall, Scan, Low Current Repeater and Voting
features will not be used in this demonstration.

The following data is to be programmed into
the corresponding channels:

Channel I:

Receive frequency	400.05 MHz
Transmit frequency	400.05 MHz
Transmit power	High
Front panel display	0I

Channel 2:

Receive frequency	400.I0 MHz
Transmit frequency	406.I0 MHz
Receive CTCSS frequency	II4.8 Hz
Transmit CTCSS frequency	II4.8 Hz
Transmit power	High
Front panel display	02

<u>Channel 3:</u>

Receive frequency	404.0 MHz
Transmit frequency	404.0 MHz
Transmit power	Medium
Front panel display	03

A hard copy of the channel information is required and the data is to be stored on disk under the name "T700DEMO.DAT".

3.1.3   **To Enter Data**

To enter radio specifications.

*   Use the →← cursor keys to invoke the 'Edit' menu from the menu bar, select "radio specification" and press <ENTER> to bring up a form titled "radio specification". A list of radio models the PGM700 supports will also be presented to you to choose from as shown in Figure 3.0.

```
┌─ < RADIO SPECIFICATIONS > ──────────────────────────┐
│                                                     │
│   Radio model                                       │
│                                                     │
│     Synth. freq              0.00  kHz              │
│                                          ┌──────────────────
│   Control head               STANDARD    │<RADIO SELECTION
│                                          │  T720
│   Tx timer                   60  sec     │  T730
│                                          │  T750
│   Channels                   1           │  T758
│                                          └──────────────────
│   Scan/Voting                0  groups              │
│                                                     │
│   Selcall active             N                      │
│                                                     │
│   Low current repeater <Y/N>?   N                   │
│                                                     │
└─────────────────────────────────────────────────────┘
```

```
┌─────────────────────────────────────────────────────────────┐
│                                                             │
│  Select the radio type with ↑↓ cursor, then [ENTER]         │
│                                                             │
└─────────────────────────────────────────────────────────────┘
```

Figure 3.0 Radio Specification data entry form

*   Use the ↑↓ cursor keys to select "T750" and press <ENTER>. PGM700 will automatically type in "T750" in the radio model field as well as the default synthesiser frequency which is l2.5 kHz for T750.

*   With the cursor in the "Synth. freq" field,
    type 10 <ENTER>. The cursor will move to the
    next field.

*   Leave the control head as standard by
    pressing <ENTER>.

*   Type 50 <ENTER> for maximum Tx timer of 50
    seconds.

*   Type 3 <ENTER> to indicate 3 channels to be
    programmed.

*   Press <Fl0> to go back to the main menu as
    Selcall, scan and voting features are not
    used in this demonstration.

    For data entry, <DEL> deletes a character in
    the current field and <F3> erases the entire
    contents of the current field.

    NOTE: PGM700 Version 3.05 only gives menus
    that are relevant to the current setting.
    Specifying a control head other than
    standard, having any scan or voting groups
    or activating the selcall option will invoke
    the appropriate sub menus in the edit menu.
    These are not required for this example and
    are covered in detail in Chapter 4.

To Enter Channel Data

*   choose the "channels" command from the EDIT
    menu. A form filled with zeros and default data
    where appropriate will be displayed.

*   It is not necessary to type in trailing zeros.

*   Type 400.05 and press <ENTER> for Rx frequency
    of Channel l, the cursor will move to the Tx
    field and fill in 400.05 automatically. This
    feature speeds up the data entry for simplex
    channel operation.

*   Press <ENTER> to accept 400.05 MHz for Tx
    frequency.

*   Press <ENTER> to ignore CTCSS Rx frequency.

*   Press <ENTER> to ignore CTCSS Tx frequency.

*   Press <ENTER> to accept the transmit power as
    high

*   Press <ENTER> to accept the default display code.

* Type 400.l and press <ENTER> for Rx frequency
  channel 2. Again the cursor will move to the Tx
  field and fill 400.l0 automatically.

* Type 406.l and press <ENTER> for Tx frequency

* Press <Fl> for help, this will cause a list of
  valid CTCSS frequency to be displayed. Use the ↑↓ keys
  to choose "ll4.8" from the list and press
  <ENTER>. PGM700 will automatically type ll4.8
  into both the CTCSS Rx and Tx field.

* Press <ENTER> to accept ll4.8 for CTCSS Tx
  frequency or repeat the step above to get a
  different tone for CTCSS Tx.

* Press <ENTER> to accept the transmit power as
  high.

* Press <ENTER> to accept the display code

* Type 404.0 and press <ENTER> for Rx frequency of
  channel 3.

* Press <ENTER> to accept the Tx frequency.

* Press <ENTER> to ignore CTCSS Rx frequency.

* Press <ENTER> to ignore CTCSS Tx frequency.

* Type M and Press <ENTER> to set transmit power
  to medium.

  Press <Fl0> to accept all the data entered and
  to return to the main menu.

  NOTE: Also in the edit menu there is a radio
  options sub menu which deals mainly with the
  radio's monitoring conditions. The default
  settings are sufficient for this example. These
  options are covered in detail in Chapter 4.

3.1.4   **To save data**

  To save data on disk.

* Use the →← cursor keys to invoke the disk
  menu from the main menu bar, select "save a
  file" and press <ENTER>. PGM700 will then
  prompt you for the name of the file to which
  you want to save the entered data.

* Type T700DEMO.DAT and press <ENTER>

* A message "writing data to disk, please
  wait" will be displayed while the data is
  being written to T700DEMO.DAT and then it
  returns to the main menu.

In order to demonstrate how to load a file
from disk into PGM700 the entered data is to
be cleared.

To clear data in PGM700

* Use the → ← cursor keys to invoke the utility
  menu from the main menu bar then select
  "clear/new" and press <ENTER>, PGM700 will
  then clear all the entered data. At this
  point, it is as if PGM700 has just been
  started.

3.1.5 To load data from disk

* Using the → ← cursor keys to invoke the disk menu
  from the main menu bar, select "load a file" and
  press <ENTER>. PGM700 will then prompt you for
  the name of the file which you would like to
  load.

  NOTE: If you have earlier specified a file,
  PGM700 will automatically type the name. This
  name can be accepted by pressing enter or a new
  file may be specified.

  * Type <u>T700DEMO.DAT</u> and press <ENTER>

  * A message "reading file from disk" will be
    displayed briefly while the data is being
    read from T700DEMO.DAT followed by "file has
    been successfully read" if the reading is
    successful. Pressing any key will take you
    back to the main menu.

    To check that the data loaded is correct.

  * Use the → ← cursor keys to invoke the edit
    menu from the main menu bar, select the
    "Radio Specifications" option and press
    <ENTER>. The radio specification form will
    be displayed. The data should be correct.

  * Press <Fl0> to go back to the main menu.

3.1.6 To program radio

* Use the → ← cursor keys to invoke the radio
  menu from the main menu bar, select the
  "Program Radio" option and press <ENTER>. A
  message "Validating all data" will briefly
  be displayed while PGM700 checks that all
  the data is valid. PGM700 will then prompt
  you for the communication port number to
  which the radio will be connected. Select
  "Com Port # I" and press <ENTER>.

* Connect a T750 radio to communication port # l
  of your computer with the lead provided,
  power up the radio and press any key to
  continue.

* Data is then written to the radio during
  which time the message "writing data to
  radio, please wait" is displayed.

* A series of '*' will appear below the
  message to indicate that the programming is
  in progress.

* A message, "Data has been successfully
  written into the radio" is displayed if the
  process is successful.

* Press any key will return you to the main
  menu.

3.1.7   **To print data**

   To produce a printed copy of the data.

* Power up your printer making sure that it is
  on-line.

* Select "print" from the Utility Menu and
  press <ENTER>.

* The printer will then print a hard copy of
  the data entered.

* A message "printing in progress...." is
  displayed during printing and then it will
  return you to the main menu.

Figure 4.0 shows the printed copy of the data.

```
PGM700 - T700 RADIO PROGRAMMING SOFTWARE                06/12/1990


< RADIO SPECIFICATIONS >-----------------------------------------------
Radio model                  : T750
Synthesiser frequency        : 12.5 KHz
Control head                 : STANDARD
Transmit timer value         : 60 sec
Channels                     : 1
Scan/Voting                  : 0   groups
Selcall active               : N

< RADIO OPTIONS >-----------------------------------------------------
Hookswitch CTCSS monitor     : N
[MON] key enabled            : Y
Tx inhibit on invalid CTCSS  : Y
BCD channel selection        : N
Control head fitted          : Y
[STAT] function enabled      : N
Status polarity, (Y) for +ve : Y
[MEM] key enabled            : Y
Auto quiet                   : Y
Quiet delay                  : 20 sec

< CHANNEL DATA >------------------------------------------------------
          Rx freq     Tx freq      CTCSS      CTCSS     Tx   Disp
Channel   [MHz]       [MHz]        Rx [Hz]    Tx [Hz]   Power code

   1    400.05000   400.05000     0.00       0.00       H    01
```

Figure 4.0   Printed copy of data

3.2   **What you have achieved**

Now exit PGM700 (choose the exit command from the
quit menu) and look at what you have created.

At the DOS prompt, type dir *.DAT and press <ENTER>.
You will see a file called "T700DEMO.DAT" this file
contains the data you have entered.

Chapter 4

4   **Menu Commands**

Before we describe the various menu options available to you, we suggest that you take a few minutes to go through the commonly used keys in PGM700. These keys together with their functions are listed in table 4.I.

While you are in data entry session, the status/information window provides an at-a-glance function key reference for your current position.

When you are in channel data entry, the default quick reference line looks like this:

FI Help, F3 clear field, F5 print data, F7 save data, FI0 entry complete
ENTER data ↑↓ →← cursor, ↑↓ page,   ESC to abort.

At the top of the main PGM700 screen is the main menu bar (as shown in Figure 2.0) which offers five choices, each invoking a pull down menu with many options.

| Key | Function |

Key   Function

FI   Brings up help with information about the current field.

F3   Erases the content of the current field.

F5   Outputs all the data to a printer

F7   Saves all the data in a file specified by you.

Fl0   Accepts all data and return to main menu

→   In main menu: Advances the cursor to the next command of
the menu bar.

In data entry: Accepts the current entered valid data and
advances the cursor to the next sequential field.

Both wrap around at the last and first fields.

←   In main menu: moves the cursor to the previous command of
the menu bar.

In data entry: Accepts the current entered valid data and
moves the cursor to the previous field.

Both wrap around at the last and first fields.

↓   In a menu: moves the selecting bar up in the command menu.

In data entry mode: moves the cursor into the field
directly above the current field while accepting the
validated data of the current field.

↑   In a menu: moves the selecting bar down in the command menu.

In data entry mode: moves the cursor into the field
directly below the current field while accepting the
validated data of the current field.

<ENTER>   In a menu: selects a menu item.

In data entry mode: confirms data entry in the current
field and advances the cursor to the next field.

<ESC>   In a menu: Leave menu without making a selection.

In data entry mode Press <ESC> twice will abort the data
entry and return to the main menu without saving any changes.

<Page Up> Moves the cursor to the previous page of data or
information if any.

<Page Dn> Moves the cursor to the next page of data or information if any.

<DEL>   Deletes one character in the current field.

<INS>   Toggles insert editing mode in the current field.

4.1   **Disk**

4.1.1   **Load a file**

This option allows you to load any file that was
produced by PGM700.

Enter the complete file name (include directory
path if appropriate) of the file you want to load.
If it cannot be found or is of an incorrect
format, an error message will be displayed in the
status window. If PGM700 already holds working
data it will be overwritten.

For a directory listing, the '*' wildcard
character may be used (e.g. B:*.DAT will display
all the filenames on drive B that match this
criteria).

"File has been successfully read" will be
displayed in the status/information window if the
file has been read successfully.

Pressing <ENTER> when no filename has been
specified or <ESC> will take you to the main menu
without loading the data.

4.1.2   **Save a file**

This option allows you to save all the entered
data in a file on to disk.

Enter the complete filename (include directory
path if appropriate) of the file you want to save
the data to (e.g. B:DEMO.DAT will save all the
data to a file called DEMO.DAT on drive B). If the
named file already existed, you will be asked if
it should be overwritten. 'N' will prohibit save
and will prompt you for another filename.

For a directory listing, the '*' wildcard
character may be used (e.g. B:*.DAT will display
all the filenames on drive B that match this
criteria).

If an error is encountered while saving data to
file, an error message will be displayed. It will
return you to the main menu if the data has been
successfully saved to the specified file.

Pressing <ENTER> when no filename has been
specified or <ESC> will take you to the main menu
without saving the data.

4.2   **Radio**

4.2.1   **Read Radio**

This option allows you to read any radio supported
by PGM700 (see chapter l for a list of radio
models supported).

<u>Setting up</u>

When this option is first selected in a new
session, it will prompt you for the communication
port that your radio is connected to. Use the up
or down arrow keys to select the desired port and
press <ENTER>. The selected port will be used for
the rest of the session; that is, it remains valid
until you exit to DOS. Should you wish to change
the communication port number, you will have to
exit to DOS and restart PGM700.

If the radio is not connected to the computer at
this point, you will now have to connect the radio
to the selected communication port of the computer
with the lead provided. Power up the radio and
then press any key to continue.

An unsuccessful logon will cause an error message
to be displayed in the status/information window:
check that power is applied to the radio, the
cable is connected to the radio and to the correct
communication port, then try again. If the logon
process is successful, the radio data will be read
by PGM700. The data is then available for
changing if desired.

A series of '*' will appear at the bottom of the
screen as the reading is in progress.

A message saying, "successfully read radio data"
will be displayed if no error is detected during
the read process. Pressing any key will return
you to the main menu.

4.2.2   **Program radio**

This option allows you to program the radio with
entered data, data read from a previously created
data file, or data read from another radio.

<u>Setting up</u>

If neither "read radio" nor "program radio" has been used before, PGM700 will prompt you for the communication port number which the radio is connected to. Use the up or down arrow key to select the desired port and press <ENTER>. The selected port will be used for the rest of the session, that is it remains valid until you exit to DOS

Should you select a wrong port or wish to change to a different port, you will have to exit to DOS and restart PGM700.

If the radio has not been connected and powered up at this point, you will have to connect the radio to be programmed to the selected port with the lead provided. Power up the radio and then press any key to continue.

PGM700 will first check that the correct radio model is connected to the selected port. It will then program the radio with the radio specification data, channel data and the voting data if applicable.

A series of '*' will appear at the bottom of the screen as the programming is in progress.

The data is then automatically read back from the radio for verification. If no discrepancy is found, a message saying "Data has been successfully written into the radio" will be displayed.

4.3 **Edit**

The Edit menu is for changing existing radio data or for creating new radio data. The menu is kept as simple as possible by only showing the choices relevant to the settings in the Radio specifications option. All data is entered by typing in the appropriate field. Alternatively the help key, <Fl> can often be used to list the choices available. The choice is selected by pressing <ENTER>. Any invalid data entered will cause the computer to emit a beep, and either clear the invalid data or warn the user of the consequences.

4.3.1 **Radio Specifications**

This option is for entering data that is related to the overall operation of the radio. It has eight settings all of which are important as to how the radio functions.

Radio model

When "radio specification" is invoked, if no radio model has been selected, a list of the radio models supported by PGM700 will be presented to the user from which a radio model can be selected.

If a radio model has previously been chosen, the list can still be obtained by pressing <Fl> when the cursor is in the radio model field.

The <ESC> key can be pressed to leave the model list without selection.

PGM700 will automatically type in the default synthesiser frequency on the selection of a new radio model.

Synthesiser frequency

There are two valid synthesiser frequencies for each radio model. Pressing <Fl> will give the two valid synthesiser frequencies for the chosen radio model.

Control head

There are currently three control heads available for the T700. Pressing <Fl> will give a selection from which the appropriate control head can be chosen.

Choosing any control head other than standard will create a memory option in the Edit menu which is for defining the memory keys which the other heads have.

Transmit timer value

This specifies the length of time for which the radio can transmit continuously. It can be set between l0 and 990 seconds in steps of l0 seconds. The default is 60 seconds.

This timer can be disabled by setting it to zero(0) seconds.

Channels

This specifies the number of channels to be programmed into the radio. Up to l00 channels may be programmed for Version 3 radios. See appendix B if your radio is an earlier version.

<u>Scan/Voting</u>

This specifies the number of scan and voting groups you have. You may have up to I6 groups for Version 3 radios. See appendix B if your radio is an earlier version.

It is not permitted to specify any active group unless the number of channels is 2 or greater. This is because a group must contain at least 2 channels.

Specifying the number of groups creates a set of group options in the edit menu for defining these groups.

<u>Selcall active</u>

This enables all the selective calling options for Version 3 radios fitted with a Tait T700-30 signalling unit. The Selcall options will appear in the edit menu if this is active (activate by typing Y).

Selective calling can be disabled by typing N.

<u>Low Current Repeater</u> (y/n)

This enables the Duplex low current repeater option for version 3 radios fitted with the appropriate hardware.
Activate low current repeater by typing Y, deactivate by typing N.
The Duplex low current repeater option will appear in the edit menu if this is active.

4.3.2 Radio Option

This section is for setting up the options that affect the way the radio operates. These options are programmable for Version 3 radios.

<u>Hookswitch CTCSS monitor</u>

When Y is specified for this option, monitor RF activity on a channel by taking the mic. off-hook.

Monitored conversation is usually activity on your channel with a different CTCSS frequency than your own. If Selcall is used then it depends on how your Selcall system is set up (see section 4.3.8.).

<u><MON> key enabled</u>

This setting is the same as hookswitch monitoring, except monitoring is achieved by pressing the <MON> key when this option is set to Y.

Tx inhibit on invalid CTCSS

If a channel is busy with an invalid CTCSS signal and the channel is not being monitored, the radio is prevented from transmitting if this feature is enabled (Type <Y>). A beep will sound from the radio when the user tries to transmit, and a double beep will sound when the channel becomes free.

Transmit inhibit on Busy

If Y is selected, the radio will be transmit inhibited if an RF carrier is detected. Note this applies only to V3.07 and later radio software.

BCD channel selection

This is for applications where the channels need to be addressed independently of the control head by BCD address. For normal operation this option should be set to N.

Control head fitted

This is for BCD addressing in applications where a Tait control head is not used. For normal operation this should be set to Y.

NOTE: When the display is disabled the version of the radio will still be displayed.

<STAT> function enabled

This when enabled (Y) provides a status indication in front of the LCD channel which can be toggled by the user pressing the <STAT> button. This is normally used in conjunction with selective calling where the status digit is transmitted. The radio on power up will keep the same status it had before the power was turned off.

Status polarity, (Y) for +ve

The status code also appears as a single BCD digit on the options connector on the control PCB. This setting presents the digit as either positive or negative logic. Y sets positive logic, N sets negative logic.

<MEM> key enabled

When set to Y enables the <MEM> button for programming memory keys, scan and priority channels.

<u>Auto quiet</u>

When a channel has been monitored by pressing the <MON> key, it can be set so that it automatically quiets itself after a specified duration of no RF activity by setting this option to Y.

<u>Quiet delay</u>

This sets the duration before a radio will automatically quiet itself. This period can be between 0 and 650 seconds with the duration starting as soon as there is no RF activity on the channel.

4.3.3   **Channel Data**

This option allows the entry of individual channel data. Seven parameters are required for each channel. They are:

* Receive frequency   (MHz)
* Transmit frequency   (MHz)
* CTCSS receive frequency (Hz)
* CTCSS transmit freq.   (Hz)
* Transmit power
* LCD display

<u>Receive frequency and transmit frequency</u>

These fields specify the frequencies which the radio will receive or transmit, with a single line corresponding to one channel. The entered data should be in the normal frequency band for the radio model specified in the radio specifications section. These frequency bands are given in chapter l or can be displayed when in a frequency field by pressing <F1>. Frequencies outside these bands will be accepted but a warning message will be issued.

The transmit or receive frequency also has to be divisible by one of the two reference frequencies valid for the radio model. The radio will automatically select the appropriate reference frequency using the frequency in the specifications section as the default.

The transmit frequency is entered with the receive frequency only if the transmit frequency is zero (O). This helps to speed up simplex channel data entry. Do not adjust the receive frequency. The software does this automatically.

Any frequency entered which is divisible by a synthesiser frequency but is outside the normal band will be accepted with a warning message.

CTCSS receive and CTCSS transmit frequencies

These fields specify the CTCSS receive and
transmit frequencies if they are used.

The entered CTCSS frequency is checked against a
look-up table. An error message is generated if
an invalid CTCSS frequency is entered.

A list of valid CTCSS frequency is displayed by
pressing <Fl> while in one of these fields.

The CTCSS transmit frequency is entered with the
CTCSS receive frequency only if the CTCSS transmit
frequency is zero (0).

Transmit power

This field specifies the transmit power for the
corresponding channel. The valid options are:

H - High
M - Medium
L - Low
X - Transmit inhibit
Any other character entered will generate an error.

LCD Display Code

This field specifies the 2 character display on
the front panel LCD display of the radios for the
corresponding channel.

The valid characters are 0..9, A, b, c, h, E and
'_' for space, otherwise an error is generated.

4.3.4   **Memory key storage**

This option allows programming of memory keys to
either channels, groups or selcall numbers. This
option is for version 3.05 radios only. (see
appendix B). There are 3 settings for each Memory
key as outlined below.

Type

This sets what type of function you want assigned
to the memory key. C sets the memory key to a
channel. G sets the key to a group. S sets the
key to a selcall Txcall identity number.

No./Txcall

This is the channel, the group or the txcall
selcall identity number you want assigned to that
memory key.

<u>Write protected</u>

Specifying Y to this option will stop the user being able to overwrite from the radio what is programmed to that memory key.

4.3.5   **Group Options**

There are two options for group functions.

<u>Channel access permitted</u>

This option when set to N will stop the user accessing individual channels. Access to a single channel may be implemented if a channel is programmed to a memory key (see memory key storage).

Channel access should be permitted if channels are to be programmed that are not included in groups.

<u>User programmable scan group l</u>

This option for Version 3 radios only, decides whether the user can define what channels they have in scan group l. Y will let the user program their own scan channels.

4.3.6   **Group Membership**

This allows the channel make-up of the groups to be specified. Enter the channel numbers which are to belong to the indicated group. You cannot enter a channel twice in the same group, but a channel may be reused in different groups.

Each group must have at least two members up to a maximum of l6 members.

4.3.7   **Group parameters**

This section allows the various parameters of the voting, scan and priority groups to be defined. The fields or parameters are outlined below. Earlier radios than Version 3.05 can only use voting groups (see appendix B).

<u>Type</u>

This sets the type of group to be used. Groups are expressed as their abbreviations A, B, S and P. These groups are:

* Voting group type A   (A)
* Voting group type B   (B)
* Scan group   (S)
* Scan group with priority channel   (P)

The voting groups select the channel in its group
with the strongest RF signal. The type of voting
system is defined by the characteristics of the
base signal. A normal community linked repeater
system would be classified as type A (intermittent
base operation).

Some bases operate in a continuous transmit mode.
The radio votes on a polling basis. This type of
operation is classified as B.

Note: Voting features may not be appropriate for
all systems.

Scan groups scan sequentially through the channel
list and lock onto a channel when a signal is present,
while a priority group is the same as a scan group
except it samples its priority channel every two and a
half seconds. If the priority channel is active, the
radio will capture the priority channel even if the
radio is locked on a scan channel.

Note: For a user programmable scan group I the
type for group I must be either "P" or "S"

<u>Vote</u>

This only applies to voting groups and decides
how often a channel is sampled during a voting
sequence. This can be set to either I or 2 samples a
voting sequence. 2 samples are normally used if
greater immunity to fast fading effects, etc. is
required. The trade-off is against the speed of the
vote. Scan and priority groups ignore this setting.

<u>Priority Channel</u>

This is only applicable to priority groups and is
the channel deemed to be the priority channel.
Scan and voting groups ignore this setting.

The priority channel does not have to be a member
of the scan group.

<u>Display</u>

This is the LCD display that is displayed on the
control head for the group. The valid characters
are 0...9 , A , b , c , h , E and _ for space.

<u>Default Tx channel</u>

This is the channel the radio will transmit on when in
a group and not locked into a channel. For scan and
priority groups this default Tx channel will change
with activity to the last captured channel. Voting
groups will also change to the last channel voted, but
will return to the default Tx channel after leaving a group.

Lead in delay (LID)

This is a delay that is sometimes required to allow for differences in key time of repeaters. This delay occurs from the time the radio first detects a busy signal, to the start of the voting sequence. It is only applicable to type A voting. Other group types ignore this parameter.

Hold Time (HLD)

A hold time may be specified. This is a delay from the time the radio loses the signal to when it resumes scanning. No scan occurs if the signal is detected again during the hold time. The hold time should be an appropriate length to stop loss of syllables in a conversation. The default is 5s.

Polling Interval (POL)

The polling interval is only applicable on type B voting systems. This specifies the time between automatic "refresher" votes on a continuous base signal system. Type A voting, scanning and priority groups ignore this parameter.

4.3.8   Selcall setup

This section describes how the radio is set up for use with the Tait T700-30 signalling module. This section and the rest of the edit section is devoted to Selcall and is only applicable if you have a Version 3.05 or later radio fitted with a T700-30 board. If this is not the case the selcall active option in the Radio Specifications section should be set to N which will set the edit menu so it does not have the selcall sections.

<Send> key enabled

Some selcall systems may not want the <Send> key to perform any function. Specifying N to this option will disable the <Send> key.

ANI enabled

An automatic number identification sequence can be transmitted with conversation to enable the base to identify the user. This feature is enabled by typing Y.

Note: The ANI position must also be specified (see section 4.3.l0).

Emergency (Y)/Priority (N)

The remote emergency switch (or optionally the
<Aux> key) may either activate a Priority Call
function or an Emergency status function depending
on how this option is set. Y sets the emergency
function and N the priority function.

<AUX> key initiates emergency/priority function

If Y is answered for this option the <Aux> key
will activate the function that is set in the
previous setting. If N, the <AUX> key will behave
normally. This setting is relevant only if you
have an Enhanced or a Keypad control head.

Last number redial

Applicable only to keypad control heads, this
setting if enabled by typing Y will allow the user
to redial the last number dialled.

Monitor CTCSS and SELCALL

This sets the monitoring conditions of the radio.
Setting this option to Y enables all RF activity
on your channel to be monitored. Setting this
option to N limits monitored conversation to your
CTCSS frequency. If on a channel with no CTCSS
frequency, this option will have no affect (i.e.
all RF activity on your channel will be monitored).

Selcall mute enabled

If Y is answered for this option, then the radio
will only unmute on reception of a valid Selcall
sequence. If N is answered then Selcall sequences
will have no effect on the mute.

4.3.9   Selcall Identity

This section is for setting the individual selcall
identification numbers. Numbers are 5 digits long
with transmission sequences having the option of
including a status digit. The status digit is
entered after the 5 digit code and can be either a
fixed digit or can be the status of the radio by
typing S. A fixed status digit may be specified as
'0-9', 'E' (emergency) or 'P' (priority). A
wildcard digit G is used to specify group calls.
All codes must have at least one starting digit
and once a G is used the subsequent digits also
have to be G.

e.g. A valid group code would be 87GGG and would
call all users whose identity code start with 87.

Fleet prefix

A prefix for codes may be specified which will limit the user to only dialling codes in their fleet. For convenience this prefix is automatically entered when programming the identity codes, but can be overwritten if codes outside the fleet are required.

Rx decode

This is the code which when received will initiate the radio to respond.

ANI code

The ANI (Automatic Number Identification) code is one which is sent during transmission so the base can identify the user. It is often the same as Rx decode, but this need not be the case. It may include a status digit.

Tx call code

This is the number which the radio will call when the <SEND> key is pressed. It may include a status digit.

Emergency/Priority code

This code is sent when the remote emergency switch is activated (or optionally the <AUX> key is pressed). It is either the priority code or the emergency code depending on how this feature is programmed (see section 4.3.8). It is often the same as the Tx call code but this need not be the case. It may include a status digit, which is often fixed as "E" or "P".

Aux call code

This is the number which the radio will call when the <SEND> key is held for approximately two seconds. It can be disabled by leaving the field blank. It may include a status digit.

Auto ack. code

This is a code the radio sends back to the caller to acknowledge the radio received the call. It can be either a selcall number or a beep by typing "BEEP". It can be disabled by leaving the field blank. The selcall number may include a status digit.

Selcall Parameters

These parameters control the details of how the Selcall system behaves. It is normally only set once for a given fleet.

Tone set

This is set to any of the standard tone sets; EEA, ZVEI-I, ZVEI-II, PVZEI, CCIR, NATEL, EIA or DZVEI. The tone set can be chosen by pressing <Fl> and selecting the tone set that is applicable to your system.

Tone period

This is the duration of each tone and may either be 20, 33, 40, 50, 60, 70 or l00 ms. This can also be selected by pressing <Fl>.

Lead in tone

A lead in tone may be specified for applications such as accessing repeaters. This can be programmed to be any digit 0-F that is valid for the tone set selected. The lead in tone can be switched off by typing X. The duration of the lead in tone is defined by the lead in delay.

Lead in delay

This delay which is for lead in tones as well as giving the transmitter time to stabilise can be set anywhere from 0 ms through to 5.l s in steps of 20 ms.

Group format

The group format can be set to either International or Sigtec. Press <Fl> and select the appropriate format.

Note: The International format may not be valid for your system.

Max status digit

If the status function is enabled (section 4.3.2.) the maximum status digit can be defined. Valid digits are 0 to 9. E and P may not be selected.

Tone blanking

Operator fatigue can be prevented by specifying Y to this option which will program the radio to automatically mute the mobile when it is decoding a valid selcall sequence.

Remote Reset

This option is reserved for future use and should be left at its default value. Future uses for this option include remote control applications and permission to speak systems.

Alert duration

This sets how long a user will hear the alert tone when their mobile has been called. This can range from 2.5 seconds to I0 minutes in steps of 2.5 seconds or alternatively it can be set to infinity by making this parameter 0. The alert is cancelled by pressing any button on the radio.

Ext alert enabled

An external device such as a car horn, etc. may be connected to the radio via the radio's power socket. This feature, when enabled by typing <Y> will activate the device when the radio receives a call, after a suitable delay (see below)

Ext alert delay

This is the delay before the external device will be activated after receiving a call. It can be set from 2.5 s to ten minutes.

Ext alert duration

This parameter defines how long the external device will sound once it is activated. It can be set from 2.5 s to ten minutes and is cancelled in the same manner as the normal alert tone.

ANI position

This controls whereabouts during transmission the ANI (Automatic Number Identification) sequence is sent. It can be set to L where the sequence is transmitted on the leading edge of the press to talk, T where it is set on the trailing edge, or R where it is sent randomly during the transmission. A combination of these can also be set. e.g. L+R+T or L+R.

ANI suppression

A suppression time where no ANI transmission occurs can also be specified. This time starts after the first ANI sequence and can range from zero (no suppression) through to ten minutes.

Defer call

If this is enabled by typing Y, any call that is
to be attempted when the channel is busy will be
deferred. The deferred call will be sent when the
channel is free, unless the operator has cancelled
the call by pressing a key. Deferred calling is
useful in that before sending a call a channel
does not have to be monitored to see if it is free.

Defer hold time

This parameter defines how long the radio will
wait for the channel to be clear when deferring a
call. Once this time has elapsed the call will be
cancelled. The time can be set from zero seconds
to ten minutes, or it may be set to infinity by
specifying a value of zero.

Group call

Users who have the keypad control head have the
ability to make unrestricted group calls. This
option when set to N will inhibit this facility.

Group display hold time

This parameter sets how long the "GrP" indication
remains flashing on the control head after a group
call. This can range from 2.5 s to ten minutes or
can be set to infinity by typing 0.

Figure 5.0 shows a printed copy of the selcall
default setting

```
< SELCALL SETUP >--------------------------------------------------
[SEND] key enabled                      : Y
ANI enabled                             : N
Emergency (Y)/Priority (N)              : N
[AUX] key initiates emergency function  : N
Last number redial                      : Y
Monitor CTCSS and Selcall               : Y

< SELCALL IDENTITY >----------------------------------------------
Fleet prefix               :
RXDECODE code              :
TXCALL code                :
Priority code              :
AUXCALL code               :
Auto ack code              : BEEP

< SELCALL PARAMETERS >--------------------------------------------
Tone set                   : CCIR
Tone period                : 20 ms
Lead in tone               : X
Lead in delay              : 500 ms
Group format               : SIGTEC
Max status digit           : 9
Tone blanking              : Y
Remote reset               : IGNORE
Alert duration             : 5 sec
Defer call                 : N
Group calls                : Y
Group display hold time    : 30 sec
```

Figure 5.0   Selcall default settings

`4.3.11`   **Duplex Low Current Repeater**

The T700 low current repeater option reduces the
current drawn by a duplexed T700 in idle mode by
switching the radio on and off according to the
settings defined on this screen.

This screen is available from the Edit menu, once you
have set the Low Current Repeater field to 'Y' on
the Specification screen.

The example screen shown in figure 6.0 is set to an
on/off duty cycle that would reduce the average
current drawn to about 100mA.

```
┌─ < DUPLEX SPECIFICATION > ─────────────────┐
│                                             │
│   Low current repeater on time in mSec      100    │
│                                             │
│   Low current repeater off time in mSec     300    │
│                                             │
│   Low current repeater hold time in 10mSec  3      │
│                                             │
│   Is radio talk through <Y/N>               Y      │
│                                             │
└─────────────────────────────────────────────┘
```

Figure 6.0   Low Current Repeater Specification

`4.4`   **Utility**

`4.4.1`   **Clear/new**

This option clears all entered information and
PGM700 will be as if you have just started.

`4.4.2`   **Print**

This option prints all entered data if any, on a
printer. If a printer error is detected, a message
"printer not ready" will be displayed in the
status window.

`4.5`   **Quit**

`4.5.1`   **Exit**

This option is used at the end of the session to
return to DOS. Note that all data must be saved
to prevent loss.

Chapter 5

Error and warning messages

PGM700 diagnostic messages fall into two classes; errors and warnings. These messages are displayed in the status/information window as they occur. A tone is also generated for each error or warning message. Errors indicate invalid data entered, illegal conditions, communication errors or an incorrect order of data entry attempted. All error messages are preceded by "Error".

Warnings do not prevent you from proceeding. They indicate that the data entered is outside the normal limits of PGM700 and thus requires your attention. Any data entered that causes a warning message will be accepted and processed accordingly. All warning messages are preceded by "Warning".

In the following lists, messages are presented alphabetically within message class. A probable cause and remedy are provided for each message.

Error Message	Possible remedies
l. Cannot open (filename)	Use a different filename
2. Cannot read (filename)	Check filename - you may have attempted to read a file which was not produced by PGM700
3. Can't check radio status, restart PGM700.	Check connection, power the radio down and up again.
4. Duplicated channel number.	Use another channel.
5. Each group must have at least 2 members.	Enter at least 2 channels for each group.
6. End of message from radio not found. Try again	Check PC-radio link.
7. Exceed maximum number of active group.	Change number of active group to any number less than or equal to l6.
8. Fail to close (filename)	Save the data under a different filename.
9. Fail to logon to radio, check PC radio connection and try again.	Check that the PC-radio link is securely connected.
l0. Fail to read file.	File is not in the right format. It may not have been created by PGM700.
ll. Fail to read radio data.	Check radio - PC connection.
l2. Fail to save data to file.	Disk could be full. Try to save the data again on a separate floppy disk. For instance, by typing A:T750.DAT
l3. Fail to send command to radio, try again.	Check radio - PC connection
l4. Fail to send data to radio, try again.	Check radio - PC connection
l5. Fail to write to (filename)	Use a different filename.
l6. (Filename) does not exist in current directory.	Type *.* <ENTER> to see the file directory.
17. First digit must be in range of 0....9.	Enter first digit from 0...9

l

Error Message	Possible remedy

18. First N digits must agree with fleet prefix code (where N is the number of digits in the Fleet prefix).

An identity code that starts with the fleet prefix should be entered.

I9. For voting, radio must have at least 2 channels.

Either set active group to zero or make number of channels greater than one (I).

20. Frequency not divisible by X kHz (X is the specified synthesiser frequency).

Either enter a frequency that is divisible by the synth frequency or change the synth frequency.

2l. 'G' must be used after the first 'G' code.

Enter a code whose remaining digits after a 'G' are 'G's.

22. Group member not specified.

Either set active group in radio specifications to zero or edit group membership.

Use the following Function Keys to change colours/attributes that PGM700 uses.

F1	Main screen	
F2	Border	
F3	Title	
F4	Text	
F5	Selected prompt	(Prompt 1)
F6	Unselected prompt	(Prompt 2)
F7	Selected data field	
F8	Unselected data field	
F10	Exit and save changes	
ESC	Exit and throw away changes	

23. Group N has an invalid member (where N is the group number).

Edit the group membership so it has valid members.

24. Illegal character used in filename.

Use a different filename. Make sure that all characters used are legal filename characters for DOS.

25. Illegal selcall code used.

Enter a code that is five digits long.

26. Illegal status code entered.

Enter either a digit or a S, E or P as the status indicator.

27. Invalid channel number specified in memory key N (where N is the memory key number).

Edit memory key storage so that a correct channel number is entered.

Error Message	Possible remedy
28. Invalid default Tx channel in group N (where N is the group number).	Set the default Tx channel in the group parameters so it is a member of the group.
29. Invalid group number specified in memory key N (where N is the memory key number).	Edit memory key storage so that a correct group number is entered.
30. Memory N stores selcall code with invalid prefix code (where N is the memory key number).	Edit memory key storage so that a legal selcall code is entered.
3l. No files match this criteria.	Type *.*<ENTER> to see the file directory.
32. PC COM port initialisation error, try again.	Check radio - PC link.
33. PC radio communication error detected, try again.	Check radio - PC link.
34. Radio data not identical to programmed data, try again.	Radio could be faulty.
35. Radio model has not been selected.	Select a radio model in the radio specifications.
36. Received error message from radio.	Recheck all the entered data.
37. Rx frequency of channel N not divisible by X kHz (X is the specified synthesiser frequency and N is the channel number).	Either enter a frequency that is divisible by the synth frequency or change the synth frequency.
38. Selcall not active but memory N stores selcall code (where N is the memory key number).	Either enable selcall or edit memory key storage so that the memory key does not store a selcall code.
39. This is not a member of the group.	Enter a channel which is a member of the group.
40. This radio can only be programmed with N channels (where N is the number of channels).	Reduce the number of channels specified in the radio specifications.
41. This radio does not have group scan capability.	
42. Voting group has no channel member.	Edit group membership so that the group has members.

Error Message	**Possible remedy**
43. Wrong radio model connected.	Make sure that the radio model specified is the same as the one connected.

Warning Messages	Things to check
l. Frequency above normal band.	Is this correct?
2. Frequency below normal band.	Is this correct?
3. Group l has been specified as an user programmable scan group.	Is the type in the group parameters set to S or P?
4. Polling interval of group N will be default to 60 s. (where N is the group number).	Have you set the correct group type?
5. Priority channel of group N will be default to l. (where N is the group number)	Have you set the correct group type?
6. This display code already exists.	Is this O.K.?
7. Selcall features not incorporated in this radio.	Selcall data will not be programmed onto the radio.
8. Voting features not incorporated in this radio.	Voting data will not be programmed onto the radio.
9. Vote of group N will be default to l. (where N is the group number).	Have you set the correct group type?

APPENDIX A

Screen Colour Configuration

On the original program disk is a file called PGM700CF.EXE. This
is a file which, when run, allows the user to configure the screen
colours and attributes to suit a desired preference. If it is not
used then a default set of attributes is selected.

How to use PGM700CF

To run the screen configuration program type PGM700CF <ENTER>. A
screen as shown below is displayed:

PGM700 Configuration - Display Colour Selection   Version 1.01

```
      ┌─ Title ────────────────────────────────┐
      │        Text                            │
      │ Prompt 1 :   Selected data field       │
      │ Prompt 2 :   Unselected data field     │
      └────────────────────────────────────────┘
```

For a colour monitor additional features are offered and the screen
appears thus:

Foreground	Background/attribute	
	Shift Fl	Main screen
F2	Shift F2	Border
F3	Shift F3	Title
F4	Shift F4	Text
F5	Shift F5	Selected prompt (Prompt I)
F6	Shift F6	Unselected prompt (Prompt 2)
F7	Shift F7	Selected data field
F8	Shift F8	Unselected data field
Fl0		Exit and save changes
ESC		Exit and throw away changes.

The top half of the screen displays an example of the different types of text used in PGM700. To change any of these colours or attributes, press the corresponding function key <F1> - <F8> as shown in the menu for monochrome systems or <F1> - <F8> and <SHIFT> <F1> - <SHIFT> <F8> for colour systems.

For example, if you wish to change the title colour, press <F3>. The effect of this will be shown. Further pressing of <F3> will scroll through the colours available.

To save the changes and exit from the program, press <Fl0>; or press <ESC> to exit from the program without saving any changes. If <Fl0> is used, a new file called "PGM700.CNF" is created or the old "PGM700.CNF" is overwritten if it already exists.

APPENDIX B

Using PGM700 Version 3.05 with older radios.

PGM700 Version 3.05 will program older versions of T700 radios,
however, new programming features in PGM700 version 3.05 will not
work on the older radios. The version number of the radio is
displayed for a few seconds when the radio is turned on. Version 3
radios or later are ideally suited for Version 3.05 programming
software.