PYRAMID
COMMUNICATIONS

Programming Instructions for:
Kenwood TK-840, 940, 941
W/ KCT-19 Option Connector
For use with:
Pyramid Communications
Model 2017/2012/2016

Revision C
December 3, 2002

Introduction

Before you begin, you will need to have a copy of KPG-25D v3.01 and programming cable available to program the mobile radio. Also, you will need a copy of the Pyramid 2017/2012 programming software and FY-1 programming cable to program the 2017/2012.

Your TK-940/941 *Mobile Radio* MUST be programmed with firmware version 3885 for mobile data applications.

Your TK-840 *Mobile Radio* MUST be programmed with firmware version 9C20 for mobile data applications.
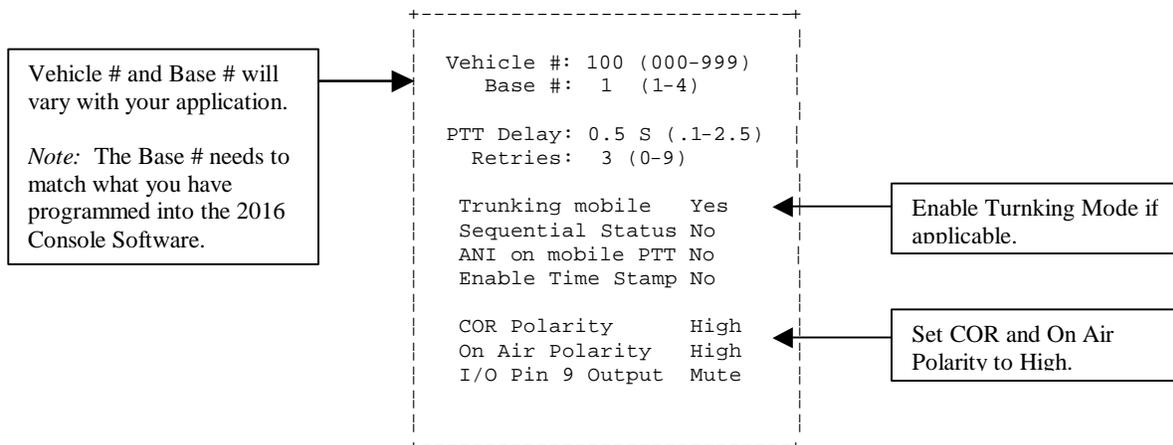
The *Base Radios* need to be programmed with the standard off-the-shelf firmware, such as version 8355.

Programming the Pyramid 2017 Merlin or 2012 MDT

The mobile data terminal needs to be programmed to accommodate the polarities of signal that the Kenwood mobile will provide it.

If you have not already done so, install the programming software on to your PC by following the instructions in the 2017/2012 service manual.

Start running the Pyramid 2017/2012 programming software on your PC. From the *Data* pull down menu, under the *System Data* screen, program the unit as shown the figure below.

```
                    +---------------------------+
                    |                           |
                    |  Vehicle #: 100 (000-999) |
                    |    Base #:  1  (1-4)       |
                    |                           |
+----------------+  | PTT Delay: 0.5 S (.1-2.5) |
| Vehicle # and Base # will | | Retries:  3 (0-9)  |
| vary with your application.| |                  |
|                |  |  Trunking mobile    Yes   |        +------------------+
| *Note:* The Base # needs to |  Sequential Status No   | <--- | Enable Turnking Mode if |
| match what you have |  ANI on mobile PTT No   |        | applicable. |
| programmed into the 2016 |  Enable Time Stamp No   |   +------------------+
| Console Software. |  |                           |
+----------------+  |  COR Polarity       High  |        +------------------+
                    |  On Air Polarity    High  | <--- | Set COR and On Air |
                    |  I/O Pin 9 Output   Mute  |        | Polarity to High. |
                    |                           |        +------------------+
                    +---------------------------+
```
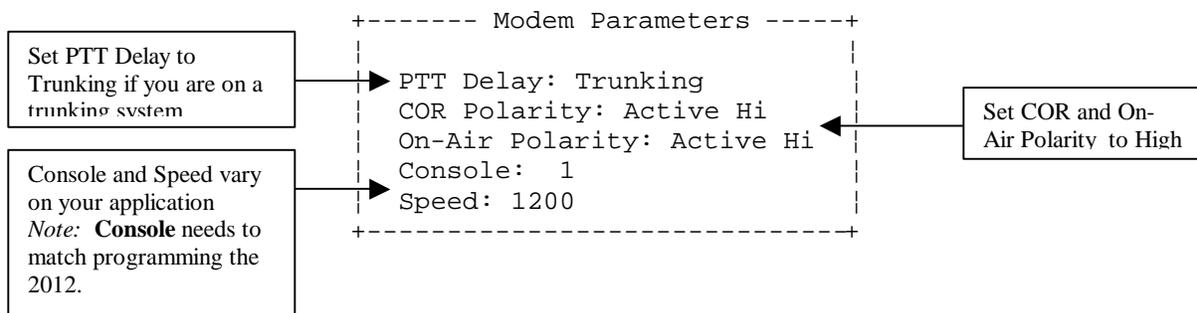
From the *Data* pull down menu, select your *Data Format* in the *Format* Screen. There are three signaling format choices. Chose the format to fit your application.

More programming instructions are available in the 2017/2012 Service Manual.
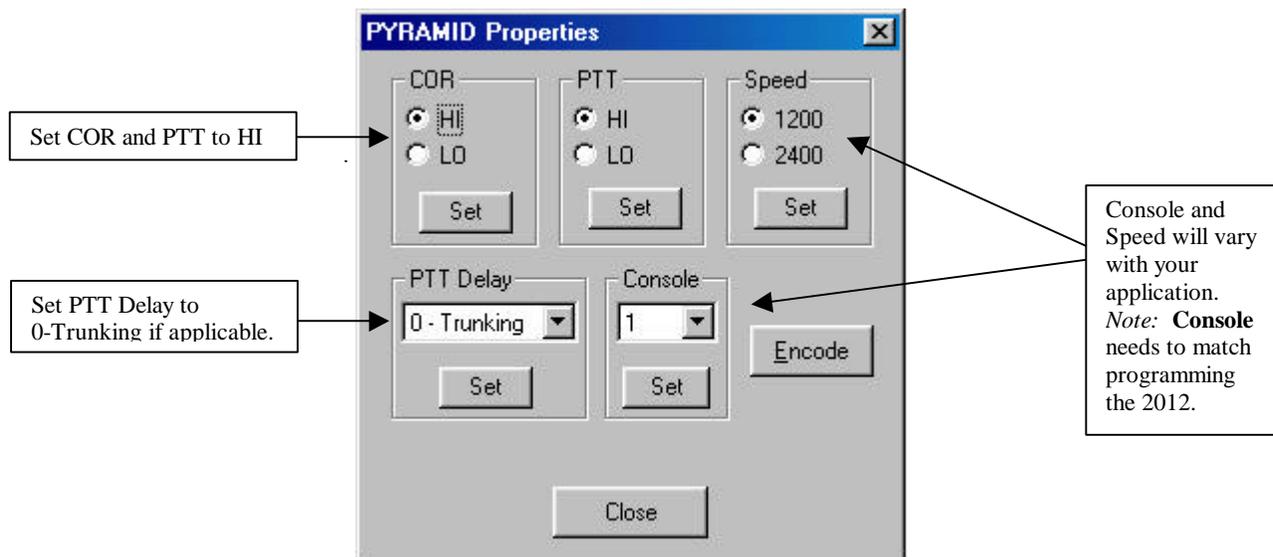
Programming the Pyramid 2016

Programming of the Pyramid 2016 base modem is done through the console interface. Typically, the parameters are set in the Pyramid Console software, and then automatically sent to the 2016. If you are using Manning NavComp Inc's RasTrac MX software for you console interface, all configuration is done within the RasTrac I/O processor that runs on your PC simultaneously with the RasTrac mapping software. Consult your RasTrac manual for more information.

The figure below shows how a typical Pyramid Console software would be set up when connected to a 2016 and TK-x40 series radio. To access the *Modem Parameters* menu, select *Configure* from the pull down menu.

Set PTT Delay to Trunking if you are on a trunking system

Console and Speed vary on your application
Note: **Console** needs to match programming the 2012.

```
+------- Modem Parameters -----+
|                              |
| PTT Delay: Trunking          |
|  COR Polarity: Active Hi     |
|  On-Air Polarity: Active Hi  |
|  Console:  1                 |
|  Speed: 1200                 |
+------------------------------+
```

Set COR and On-Air Polarity to High

See the Pyramid 2016 service manual for further Pyramid Console software information.

The figure below shows how a typical RasTrac I/O processor will be set up when connected to a 2016 and TK-x40 series radio. To access the I/O configuration, select the *Edit* pull down menu from the RasTrac I/O Processor. From the *Input/Output Configuration* screen, select the *Protocol* to be PYRAMID. Then click *Properties* to configure the 2016.

Set COR and PTT to HI

Set PTT Delay to 0-Trunking if applicable.

Console and Speed will vary with your application. *Note:* **Console** needs to match programming the 2012.

Programming the Kenwood TK-x40 Series Mobile

To begin programming your TK-x40 series mobile for use with the Pyramid Communications Model 2012/2016 mobile data terminal system, you will need to first create a new profile using your KPG-25D programming software.

Programming the Talk Group info. for a 2017 Merlin or 2012 MDT

When using the TK-x40 series radio in mobile operation along with a Pyramid 2017/ 2012, it is desirable to use a separate talk group for data aside from voice communication. In order to do this, it is necessary to add a talk group for data to the system. The figure below depicts a typical talk group configuration.

```
+----------------------------------------------------------------------+
¦ System No. : 1       Format : Trunking                               ¦
¦----------------------------------------------------------------------¦
¦       ID                        Opt Group                            ¦
¦ F Grp  Enc  Dec  Grp-Name  Call Horn Sig Lockout Trnspnd TlkArnd Data ¦
¦    1   58   58   VOICE CH  No   No   No   No      No      No      No   ¦
¦    2   59   59   DATA CH   No   No   No   No      No      No      Yes  ¦
¦    3                                                                  ¦
¦    4                                                                  ¦
¦    5                                                                  ¦
¦    6                                                                  ¦
¦    7                                                                  ¦
¦    8                                                                  ¦
¦    9                                                                  ¦
¦   10                                                                  ¦
+----------------------------------------------------------------------+
```

Separate Talk Group ID codes are used for voice and data.

Data should be set to Yes

Feature Options

From the *Edit* pull down menu, select *Feature Option*. Enter the *Data* screen. In this screen you will need to set the **Data System/Group** to the System/Group of the Data LTR or Conventional ID in the radio. Set **Data PTT with QT/DQT = Yes**

Example: Setting system 1 group 2 as the data group for the radio. This setting is global.

Data System/Group
System: [1] Group:[2]

Programming the Talk Group information for a 2016 Base

The 2016 base modem operates differently than the 2012 mobile unit. As the 2012 changes talk groups for data and voice, the 2016 requires the radio to be only programmed with the data talk group. This makes the base TK-x40 radio in to a stand-alone data radio. No voice is to be used on the base TK-x40 connected to the 2016.

To program the talk group data for a 2016 interface simply add one system and one group to the radio, and do not define any talk group for data. The figure below illustrates a typical talk group setup for a 2016 base unit.

```
+-----------------------------------------------------------------------+
¦ System No. : 1      Format : Trunking                                 ¦
¦-----------------------------------------------------------------------¦
¦         ID                        Opt Group                           ¦
¦ F Grp  Enc  Dec  Grp-Name  Call Horn Sig Lockout Trnspnd TlkArnd Data  ¦
¦    1   59   59   DATA CH    No   No   No    No      No      No     No   ¦
¦    2   58   58   VOICE      No   No   No    No      No      No     Yes  ¦
¦    3                                                                   ¦
¦    4                                                                   ¦
¦    5                                                                   ¦
¦    6                                                                   ¦
¦    7                                                                   ¦
¦    8                                                                   ¦
¦    9                                                                   ¦
¦   10                                                                   ¦
+-----------------------------------------------------------------------+
```

Single talk group operation. This talk group is for data only

Data should be set to *Yes* on the *VOICE* Group ID.

Feature Options

From the *Edit* pull down menu, select *Feature Option*. Enter the *Data* screen. In this screen you will need to set the **Data System/Group** to the System/Group of the **Voice*** LTR or Conventional ID in the radio. Set **Data PTT with QT/DQT = Yes**

Example: Setting system 1 group 2 as the data group for the radio. This setting is global.

Data System/Group
System: [1] Group:[2]

* Remember that you are programming the base radio exactly opposite from the mobile radio as far as which group you define as data.

Understanding Base Channel Change

In order to understand the operation of data channel change you have to realize that the mobile units are using a dedicated LTR ID code for *data* and a separate LTR ID code(s) for *voice* communication. When the MDT sends a message, the mobile radio is switched to the defined *data* LTR ID; after the transmission is complete, the radio reverts back to the *voice* ID code. The 2016 base unit receives and responds on the *data* LTR ID code.

A problem arises when the dispatcher needs to send an outbound message (e.g. GPS Poll, Text Message, Horn Honk, etc.). At most times, the mobile units are idle and therefore on the *voice* LTR ID code. When a message from the base is sent, it is sent on the *data* LTR ID code, thus the targeted mobile unit does not receive the command from the dispatcher because it is listening on a different LTR ID code.

To overcome this obstacle, the 2016 can be configured to change to the *voice* LTR ID code when sending outbound, base originated messages. As with all base modem installations, a dedicated radio is required for the 2016 base modem.

Configuring your 2016 for Voice Channel Change

There is a simple wiring harness change is needed to enable the 2016 to activate the channel change line out of the 2016 Base Modem. From the 2016 wiring harness, connect the Teal wire ground. This activates the Grey wire as the Voice Channel Select line.

Crimp a Molex pin onto the Grey wire from the Pyramid Communications Model 2016 wiring harness and connect to the Kenwood KCT-19 Pin 15. See figure below of Molex pin layout.

Yellow	Blue	Black/ Shield
Red	Green	White
	Violet	
		Grey

Grey Wire to Pin 15

Viewed from Back
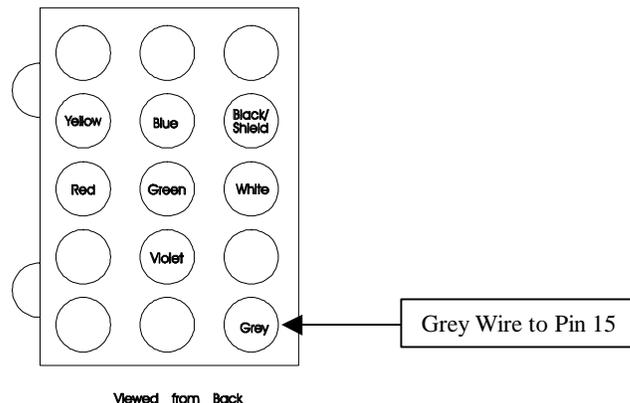
Connecting the Pyramid to the TK-x40 Radio

Once all of the programming has been completed, it is time to connect the units to the radios.

Connecting the 2017 Merlin and 2012 MDT to the TK-x40 radio

The following are the pin outs for the KCT-19 option connector of the TK-x40 series radios. These connections must be made to the corresponding color-coded cable from the 2012. Install the KCT-19 "E" plug into CN-2.

Connections: 2012	Function	Radio
Black/Shield	Ground	KCT-19 Pin 6
White	Tx Audio Out	KCT-19 Pin 9
Blue	On-Air Detect	KCT-19 Pin 13
Green	PTT Out	KCT-19 Pin 8
Red	Switched B+	KCT-19 Pin 7
Yellow	Rx Audio In	KCT-19 Pin 4
Violet	COR	KCT-19 Pin 11
Brown	Audio Mute Out	N/C
Grey	Mic Mute/Channel Select	N/C

Jumper Settings in the 2012

J1	[Out]	Tx audio level
J2	[Out]	Local PTT Loop

Connecting the 2016 base to the TK-x40 radio

The following are the pin outs for the KCT-19 option connector of the TK-x40 series radios. These connections must be made to the corresponding color-coded cable from the 2016. Install the KCT-19 "E" plug into CN-2.

Connections: 2016	Function	Radio
Black/Shield	Ground	KCT-19 Pin 6
White	Tx Audio Out	KCT-19 Pin 9
Blue	On-Air Detect	KCT-19 Pin 13
Green	PTT Out	KCT-19 Pin 8
Red	Switched B+	KCT-19 Pin 7
Yellow	Rx Audio In	KCT-19 Pin 4
Violet	COR	KCT-19 Pin 11
Brown	Audio Mute Out	N/C
Grey	Mic Mute/Channel Select	KCT-19 Pin 5
Teal	Enable Channel Change	KCT-19 Pin 6