PYRAMID
COMMUNICATIONS

Programming Instructions for:

Kenwood TK-780, 880, 980, 981 (Version 2)
W/ KCT-19 Option Connector

For use with:

Pyramid Communications
Model 2012/2016/Merlin

Revision E

November 25, 2002

Introduction

Before you begin, you will need to have a copy of KPG-49D and programming cable available to program the mobile radio. Also, you will need a copy of the Pyramid 2012 programming software and FY-1 programming cable to program the 2012.
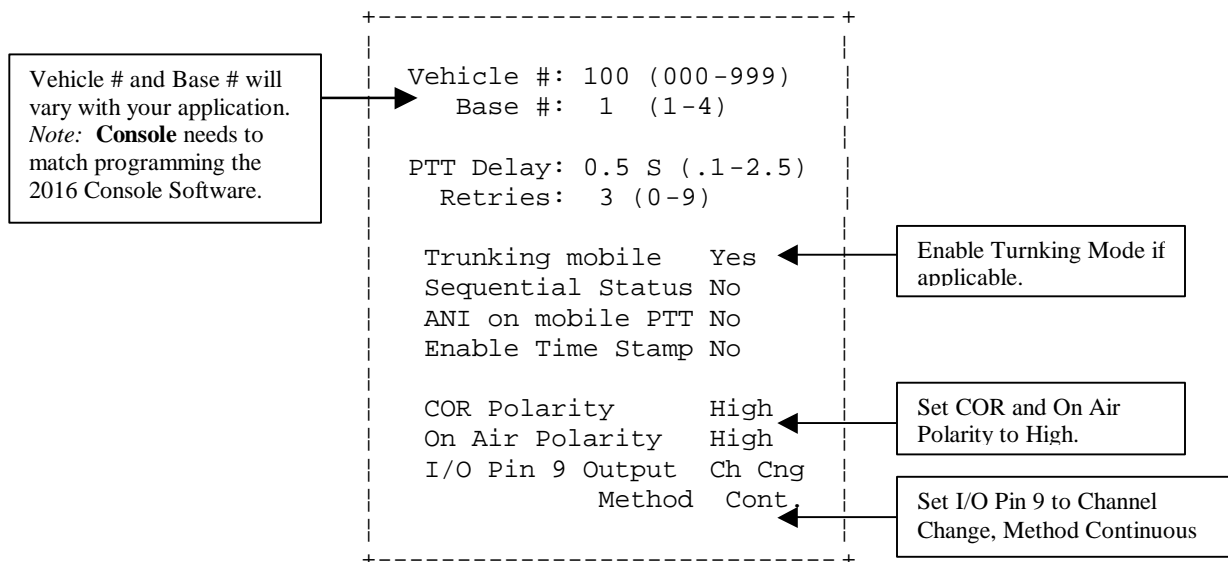
*** In older versions of Pyramid Communications 2016 and 2012 units, you will need to replace the PTT transistor with a standard NPN (2N4401) transistor. Without this modification, you will experience no transmit audio out of the Kenwood 80 Series version-2 radios. (2012 PTT transistor Q2, 2016 PTT transistor Q3)*

Programming the Pyramid 2012/Merlin

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 2012/Merlin service manual.

Start running the Pyramid 2012/Merlin 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 # and Base # will |  Vehicle #: 100 (000-999)  |
vary with your application.|    Base #:  1   (1-4)      |
Note: Console needs to    |                            |
match programming the     |  PTT Delay: 0.5 S (.1-2.5) |
2016 Console Software.    |    Retries:  3 (0-9)       |
                          |                            |
                          |   Trunking mobile    Yes   | <---- Enable Turnking Mode if
                          |   Sequential Status  No    |       applicable.
                          |   ANI on mobile PTT  No    |
                          |   Enable Time Stamp  No    |
                          |                            |
                          |   COR Polarity       High  | <---- Set COR and On Air
                          |   On Air Polarity    High  |       Polarity to High.
                          |   I/O Pin 9 Output   Ch Cng |
                          |             Method   Cont  | <---- Set I/O Pin 9 to Channel
                          |                            |       Change, Method Continuous
                          +----------------------------+
```

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.
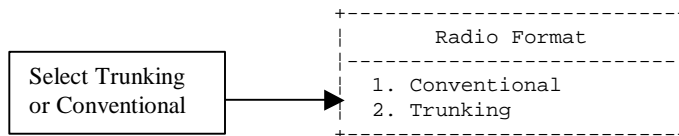
More programming instructions are available in the 2012/Merlin Service Manual.

Programming the Kenwood TK-x80 Series Mobile

To begin programming your TK-x80 series mobile for use with the Pyramid Communications Model 2012/Merlin mobile data system, you will need to first create a new profile using your KPG-49D programming software.
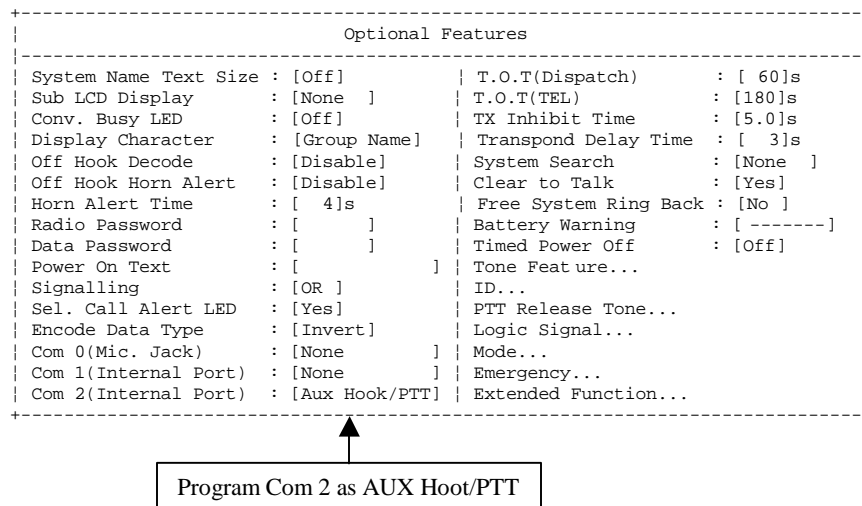
Radio Format

When programming the radio select trunking or conventional, make sure that you set the Radio Format correctly upon creation of your new profile. See figure below.
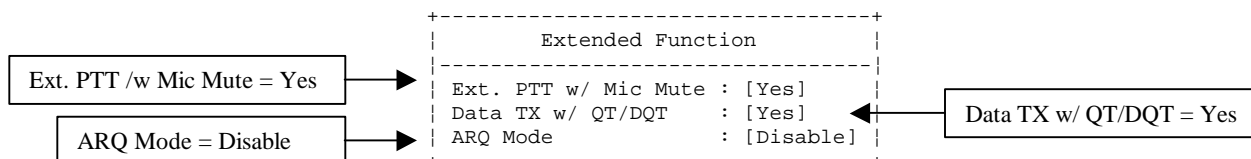
```
                          +-------------------------+
                          ¦        Radio Format     ¦
  +-----------------+     ¦-------------------------¦
  | Select Trunking |     ¦   1. Conventional       ¦
  | or Conventional |---->¦   2. Trunking           ¦
  +-----------------+     +-------------------------+
```

Programming Optional Features

From the *Edit* pull down menu, select *Optional Features*. Depending on your application, most of the parameters in the *Optional Feature* menu will be left at default. Although this may be the case, in order to enable a data terminal interface you must program Com 2 (Internal Port) as AUX Hook/PTT. This enables the external PTT from the data terminal. See the figure below for more information.
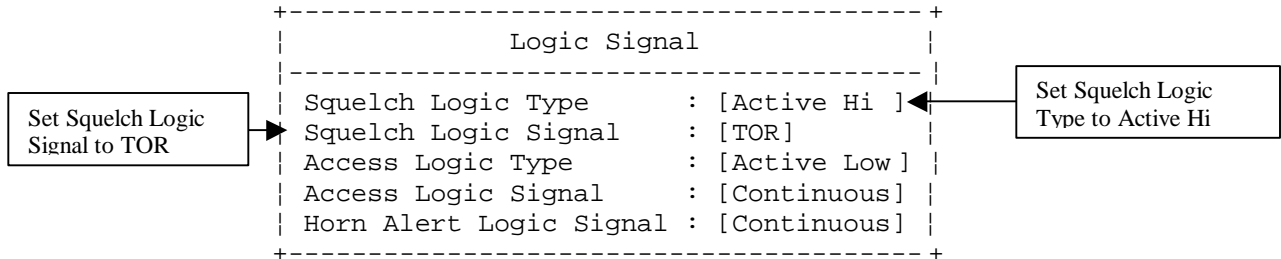
```
+-----------------------------------------------------------------------+
¦                         Optional Features                             ¦
¦-----------------------------------------------------------------------¦
¦ System Name Text Size : [Off]       ¦ T.O.T(Dispatch)       : [ 60]s  ¦
¦ Sub LCD Display       : [None ]     ¦ T.O.T(TEL)            : [180]s   ¦
¦ Conv. Busy LED        : [Off]       ¦ TX Inhibit Time       : [5.0]s   ¦
¦ Display Character     : [Group Name]¦ Transpond Delay Time  : [  3]s   ¦
¦ Off Hook Decode       : [Disable]   ¦ System Search         : [None ]  ¦
¦ Off Hook Horn Alert   : [Disable]   ¦ Clear to Talk         : [Yes]    ¦
¦ Horn Alert Time       : [ 4]s       ¦ Free System Ring Back : [No ]    ¦
¦ Radio Password        : [     ]     ¦ Battery Warning       : [ ------]¦
¦ Data Password         : [     ]     ¦ Timed Power Off       : [Off]    ¦
¦ Power On Text         : [        ]  ¦ Tone Feature...                  ¦
¦ Signalling            : [OR ]       ¦ ID...                            ¦
¦ Sel. Call Alert LED   : [Yes]       ¦ PTT Release Tone...              ¦
¦ Encode Data Type      : [Invert]    ¦ Logic Signal...                  ¦
¦ Com 0(Mic. Jack)      : [None    ]  ¦ Mode...                          ¦
¦ Com 1(Internal Port)  : [None    ]  ¦ Emergency...                     ¦
¦ Com 2(Internal Port)  : [Aux Hook/PTT]¦ Extended Function...           ¦
+-----------------------------------------------------------------------+
```

Program Com 2 as AUX Hoot/PTT

While in the *Optional Features* screen, select *Extended Function*. Set as follows:

```
              +-----------------------------------+
              ¦          Extended Function        ¦
              ¦-----------------------------------¦
  Ext. PTT /w Mic Mute = Yes ---->¦ Ext. PTT w/ Mic Mute : [Yes]      ¦
              ¦ Data TX w/ QT/DQT    : [Yes]      ¦<--- Data TX w/ QT/DQT = Yes
  ARQ Mode = Disable --->¦ ARQ Mode             : [Disable]  ¦
              +-----------------------------------+
```
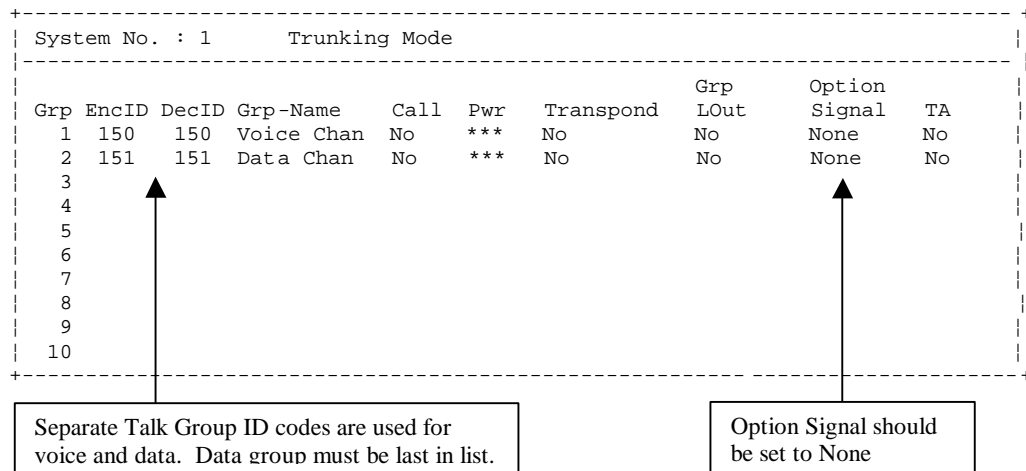
Programming the Logic Signalling

From the *Optional Features* screen, use your cursor to select *Logic Signalling*. In order for the radio to provide proper signaling polarities to the 2012/Merlin and 2016 data terminal interface on the KCT-19, it is necessary to program the Logic Signalling I/O as shown in the figure below.

```
+-----------------------------------------+
¦                Logic Signal             ¦
¦-----------------------------------------¦
¦ Squelch Logic Type       : [Active Hi ] ¦
¦ Squelch Logic Signal     : [TOR]        ¦
¦ Access Logic Type        : [Active Low] ¦
¦ Access Logic Signal      : [Continuous] ¦
¦ Horn Alert Logic Signal  : [Continuous] ¦
+-----------------------------------------+
```

Set Squelch Logic Signal to TOR

Set Squelch Logic Type to Active Hi

Programming the Talk Group information for a 2012/Merlin MDT

When using the TK-x80 series radio in mobile operation along with a Pyramid 2012/Merlin, 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       Trunking Mode                                          ¦
¦-----------------------------------------------------------------------------¦
¦                                             Grp      Option                 ¦
¦ Grp EncID DecID Grp-Name   Call  Pwr  Transpond  LOut   Signal    TA        ¦
¦  1  150   150  Voice Chan  No    ***  No         No     None      No        ¦
¦  2  151   151  Data Chan   No    ***  No         No     None      No        ¦
¦  3                                                                          ¦
¦  4                                                                          ¦
¦  5                                                                          ¦
¦  6                                                                          ¦
¦  7                                                                          ¦
¦  8                                                                          ¦
¦  9                                                                          ¦
¦ 10                                                                          ¦
+-----------------------------------------------------------------------------+
```

Separate Talk Group ID codes are used for voice and data. Data group must be last in list.

Option Signal should be set to None

Defining a Talk Group for Data Use

There are two places in the system information screen that you have to define a talk group as being a data talk group.

First, select the data talk group with your cursor, and press the *F9 Key*. This will bring up the *System Data* screen as shown in the figure below. Program the *Data System/Group* for the system and group number in your radio. This value will vary based on how many systems and groups are programmed into your radio.

```
+----------------------------------+
¦             System Data          ¦
¦----------------------------------¦
¦ System Name      : [  1       ]  ¦
¦ System Lockout   : [***]         ¦
¦ Scan Weight      : [*]           ¦
¦ Auto TEL Search  : [No ]         ¦
¦ TA Busy Ch LOut  : [No ]         ¦
¦ Wide/Narrow      : [******]      ¦
¦ Fix ID             1st    2nd    ¦
¦  ID              : [   ]  [   ]  ¦
¦  Call Indicator  : [***]  [***]  ¦
¦  Horn Alert      : [***]  [***]  ¦
¦  Opt Signalling  : [****] [****] ¦
¦ Block ID's         Start   Stop  ¦
¦  Telephone       : [     -    ]  ¦
¦  TX Inhibit      : [     -    ]  ¦
¦  Decode          : [     -    ]  ¦
¦ Data System/Group : [  1 -   2 ] ¦
¦ Data Delay Time  : [ 15]ms       ¦
+----------------------------------+
```

Program the appropriate System/Group for the data group →

Second, you must define the talk group as data in the group information screen. To access the group information screen, select the data talk group with your cursor and press the *F10 key*. The figure below shows how to define the talk group as data.
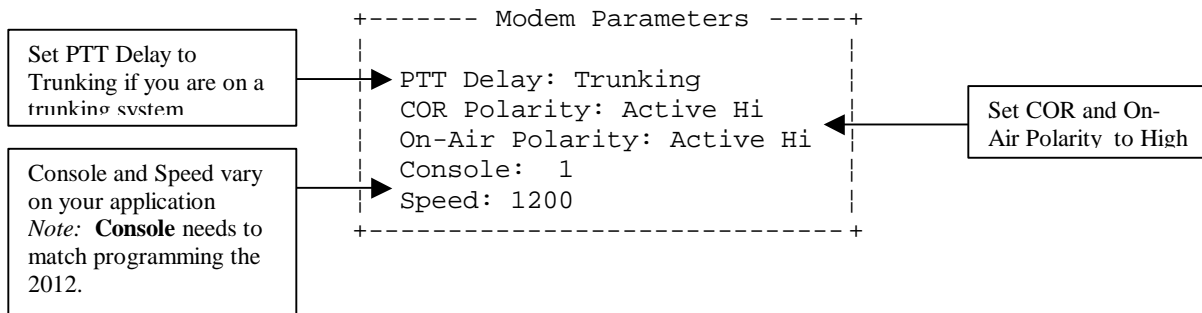
```
+----------------------------------+
¦            Group Data 2          ¦
¦----------------------------------¦
¦ Encode ID        : [151]         ¦
¦ Decode ID        : [151]         ¦
¦ Group Name       : [Data Chan ]  ¦
¦ TX Power         : [****]        ¦
¦ Call Indicator   : [No ]         ¦
¦ Horn Alert       : [No ]         ¦
¦ Option Signalling : [None]       ¦
¦ Group-Lockout    : [No ]         ¦
¦ Transpond        : [No ]         ¦
¦ Talk Around      : [No ]         ¦
¦ Compander        : [***]         ¦
¦ Home Group       : [***]         ¦
¦ PTT ID           : [Off]         ¦
¦ Data             : [Yes]         ¦
+----------------------------------+
```

Set Data to Yes →

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.
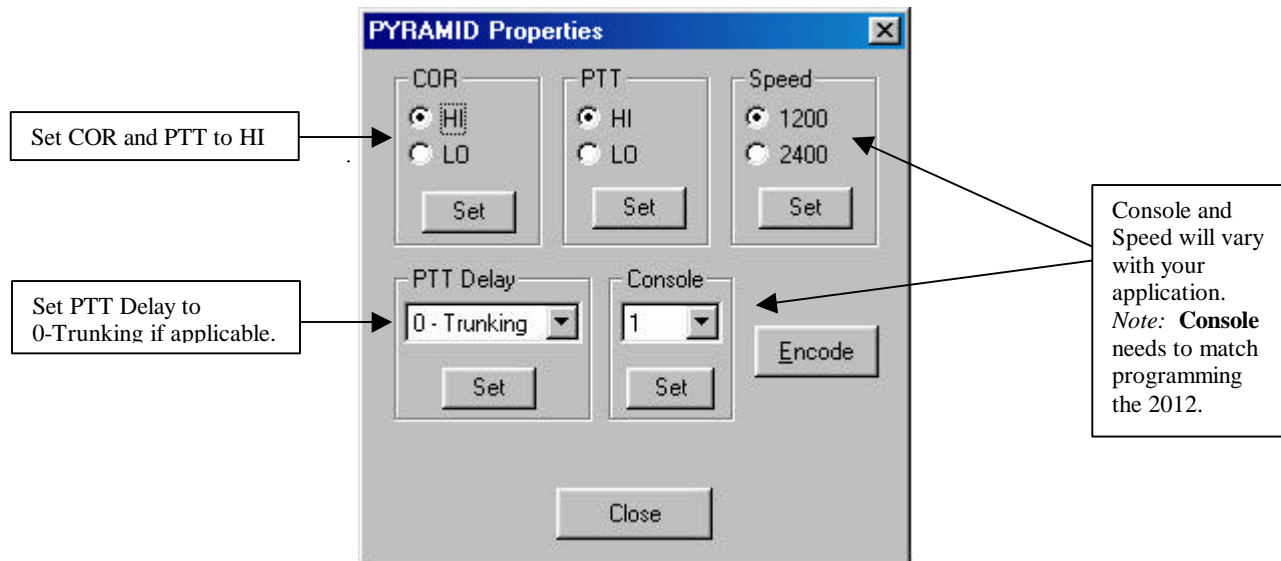
The figure below shows how a typical Pyramid Console software would be set up when connected to a 2016 and TK-x80 series radio. To access the **Modem Parameters** menu, select **Configure** from the pull down menu.
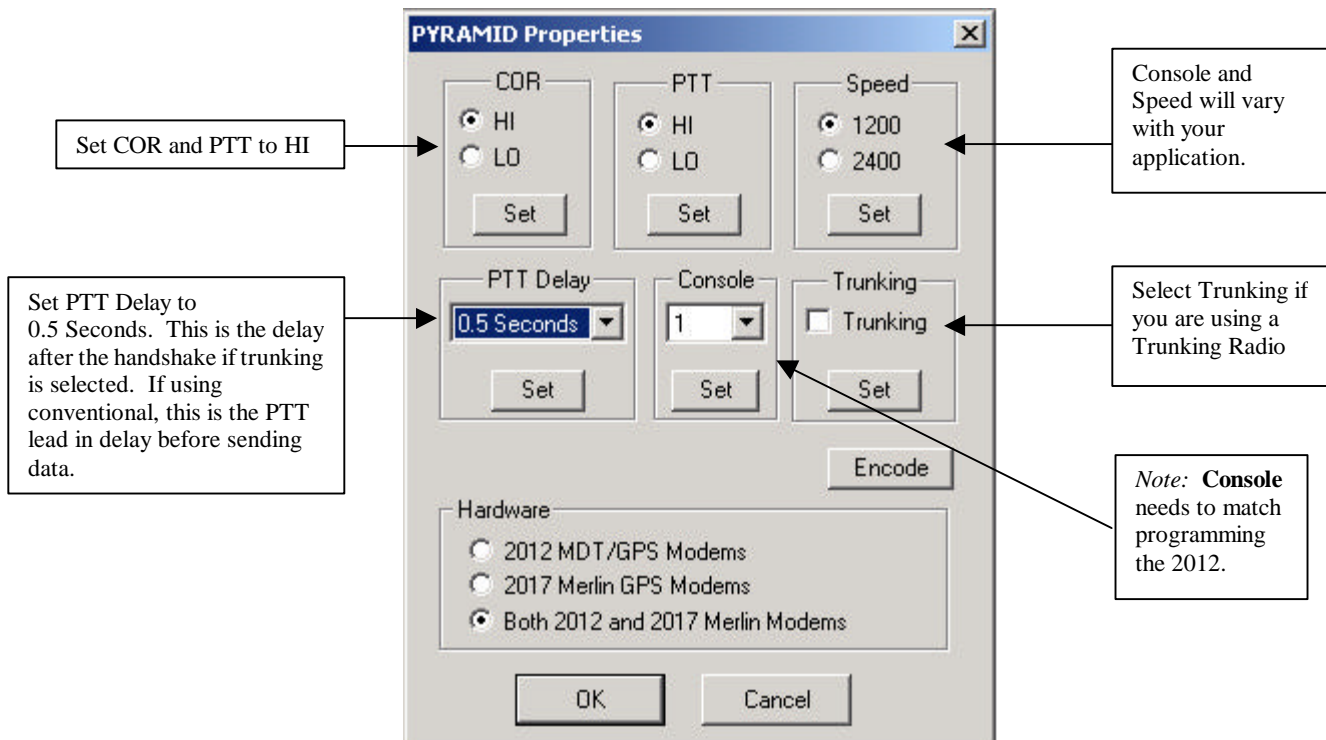
```
                           +------- Modem Parameters -----+
                           ¦                              ¦
  Set PTT Delay to         ¦► PTT Delay: Trunking         ¦
  Trunking if you are on a ¦   COR Polarity: Active Hi    ¦        Set COR and On-
  trunking system          ¦   On-Air Polarity: Active Hi ¦        Air Polarity to High
                           ¦   Console:  1                ¦
  Console and Speed vary   ¦► Speed: 1200                 ¦
  on your application      +------------------------------+
  Note:  Console needs to
  match programming the
  2012.
```

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

Programming the Pyramid 2016 (Continued)

The figures below shows how a typical RasTrac I/O processor will be set up when connected to a 2016 and TK-x80 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.

Depending on the version of the Rastrac IOP you are using, your IOP setup screen may look like either of these examples.

Set COR and PTT to HI

Console and Speed will vary with your application.

Set PTT Delay to
0.5 Seconds. This is the delay after the handshake if trunking is selected. If using conventional, this is the PTT lead in delay before sending data.

Select Trunking if you are using a Trunking Radio

Note: **Console** needs to match programming the 2012.

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 PassPort/LTR ID code for *data* and a separate PassPort/LTR ID code(s) for *voice* communication. When the MDT sends a message, the mobile radio is switched to the defined *data* PassPort/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* PassPort/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* PassPort/LTR ID code. When a message from the base is sent, it is sent on the *data* PassPort/LTR ID code, thus the targeted mobile unit does not receive the command from the dispatcher because it is listening on a different PassPort/LTR ID code.

To overcome this obstacle, the 2016 can be configured to change to the *voice* PassPort/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.
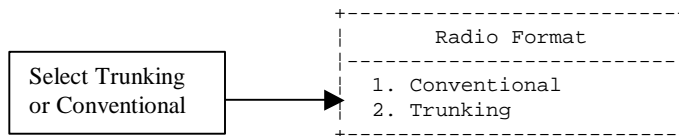

Grey Wire to Pin 15

Viewed from Back
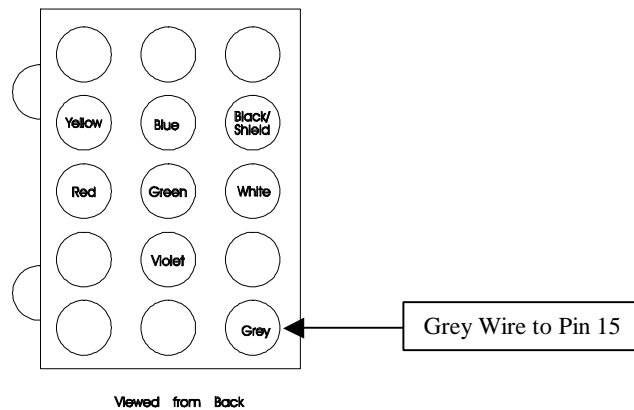
Programming the Kenwood TK-x80 Series Base

To begin programming your TK-x80 series mobile for use with the Pyramid Communications Model 2016 base modem, you will need to first create a new profile using your KPG-49D programming software.
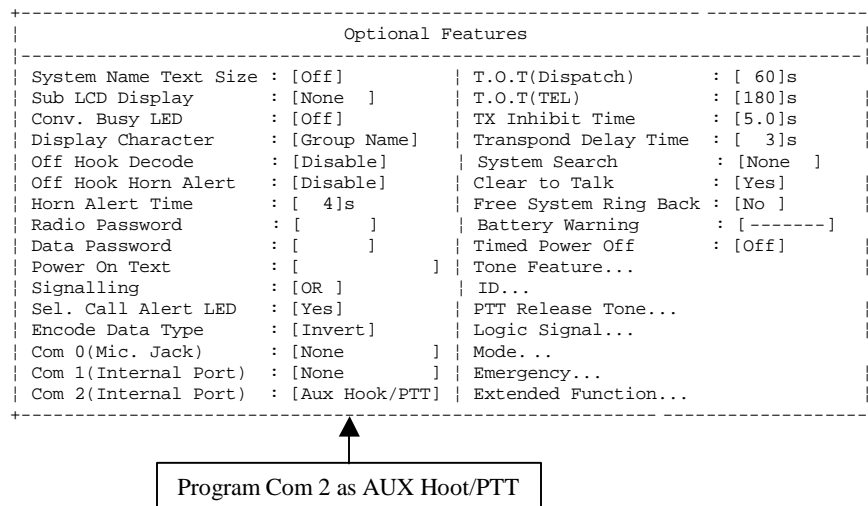
Radio Format

When programming the radio select trunking or conventional, make sure that you set the Radio Format correctly upon creation of your new profile. See figure below.
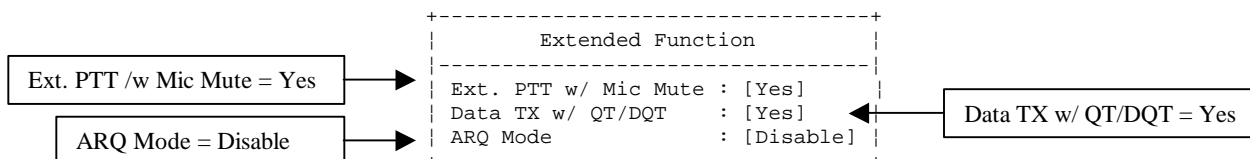
```
                          +--------------------------+
                          ¦      Radio Format        ¦
  +-------------------+   ¦--------------------------¦
  | Select Trunking   |   ¦   1. Conventional        ¦
  | or Conventional   |-->¦   2. Trunking            ¦
  +-------------------+   ¦                          ¦
                          +--------------------------+
```

Programming Optional Features

From the *Edit* pull down menu, select *Optional Features*. Depending on your application, most of the parameters in the *Optional Feature* menu will be left at default. Although this may be the case, in order to enable a data terminal interface you must program Com 2 (Internal Port) as AUX Hook/PTT. This enables the external PTT from the data terminal. See the figure below for more information.
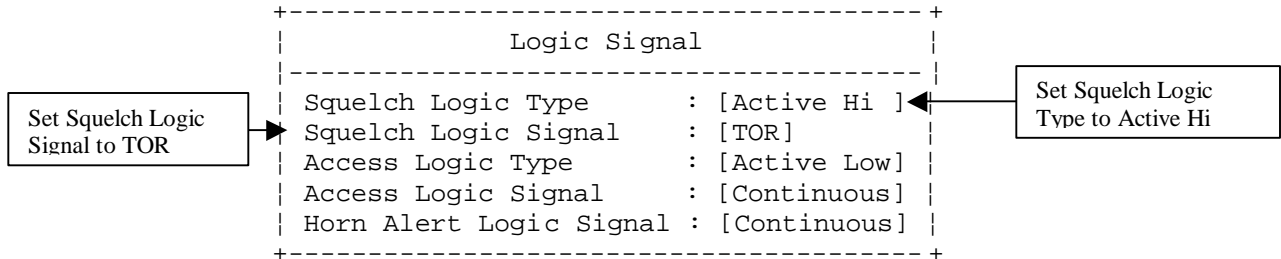
```
+--------------------------------------------------------------- ---------------+
¦                          Optional Features                                    ¦
¦-------------------------------------------------------------------------------¦
¦ System Name Text Size : [Off]          ¦ T.O.T(Dispatch)       : [ 60]s        ¦
¦ Sub LCD Display       : [None  ]       ¦ T.O.T(TEL)            : [180]s        ¦
¦ Conv. Busy LED        : [Off]          ¦ TX Inhibit Time       : [5.0]s        ¦
¦ Display Character      : [Group Name]   ¦ Transpond Delay Time  : [  3]s        ¦
¦ Off Hook Decode       : [Disable]       ¦ System Search         : [None  ]      ¦
¦ Off Hook Horn Alert   : [Disable]       ¦ Clear to Talk         : [Yes]         ¦
¦ Horn Alert Time       : [  4]s          ¦ Free System Ring Back : [No ]         ¦
¦ Radio Password        : [      ]        ¦ Battery Warning       : [-------]     ¦
¦ Data Password         : [      ]        ¦ Timed Power Off       : [Off]         ¦
¦ Power On Text         : [           ] ¦ Tone Feature...                       ¦
¦ Signalling            : [OR ]           ¦ ID...                                 ¦
¦ Sel. Call Alert LED   : [Yes]           ¦ PTT Release Tone...                   ¦
¦ Encode Data Type      : [Invert]        ¦ Logic Signal...                       ¦
¦ Com 0(Mic. Jack)      : [None       ]   ¦ Mode...                               ¦
¦ Com 1(Internal Port)  : [None       ]   ¦ Emergency...                          ¦
¦ Com 2(Internal Port)  : [Aux Hook/PTT]  ¦ Extended Function...                  ¦
+-------------------------------------------------------------------------------+
```

+-----------------------------+
| Program Com 2 as AUX Hoot/PTT |
+-----------------------------+

While in the *Optional Features* screen, select *Extended Function*. Set as follows:

```
                     +---------------------------------+
                     ¦        Extended Function        ¦
                     ¦---------------------------------¦
+--------------------------+  ¦                             ¦
| Ext. PTT /w Mic Mute = Yes |->¦ Ext. PTT w/ Mic Mute : [Yes]    ¦
+--------------------------+  ¦ Data TX w/ QT/DQT    : [Yes]    ¦<-  +-----------------------+
+--------------------------+  ¦ ARQ Mode             : [Disable] ¦   | Data TX w/ QT/DQT = Yes |
| ARQ Mode = Disable        |->¦                                 ¦   +-----------------------+
+--------------------------+  +---------------------------------+
```

Programming the Logic Signalling

From the *Optional Features* screen, use your cursor to select *Logic Signalling*. In order for the radio to provide proper signaling polarities to the 2012/Merlin and 2016 data terminal interface on the KCT-19, it is necessary to program the Logic Signalling I/O as shown in the figure below.

```
            +----------------------------------------+
            |                Logic Signal            |
            |----------------------------------------|
            | Squelch Logic Type      : [Active Hi ] |
            | Squelch Logic Signal    : [TOR]        |
            | Access Logic Type       : [Active Low] |
            | Access Logic Signal     : [Continuous] |
            | Horn Alert Logic Signal : [Continuous] |
            +----------------------------------------+
```

Set Squelch Logic Signal to TOR

Set Squelch Logic Type to Active Hi

Programming the Talk Group information for a 2016 Base Modem

The following is an example of how to setup your Kenwood 80 series radio for voice channel change on base initiated messages. **Group 1** is the *data* channel. This is the channel that all messages from mobile units will be received on. **Group 2** is the channel that all of the *voice* traffic will be occurring.

When the 2016 base modem keys up the base radio to send a outbound message, the radio will be switched to **Group 2**; after the transmission it will immediately revert back to **Group 1** to listen for messages from any MDT unit.

Follow the screen shots below to program the Kenwood radio for group change.

Add data group and voice group to list.

```
+-----------------------------------------------------------------------------+
| System No. : 1       Trunking Mode                                          |
|-----------------------------------------------------------------------------|
|                                           Grp      Option                    |
| Grp EncID DecID Grp-Name   Call  Pwr  Transpond  LOut     Signal   TA        |
|  1   1     1    Group 1    No    Hi   No         No       None     No        |
|  2   2     2    Group 2    No    Hi   No         No       None     No        |
|  3                                                                           |
|  4                                                                           |
|  5                                                                           |
|  6                                                                           |
|  7                                                                           |
|  8                                                                           |
|  9                                                                           |
| 10                                                                           |
+-----------------------------------------------------------------------------+
```

Add the Data and voice group to the system.

Select the voice group and press *F9* to setup *System Data.*

```
+-----------------------------------+
|            System Data            |
|-----------------------------------|
| System Name      : [          ]   |
| System Lockout   : [***]          |
| Scan Weight      : [*]            |
| Auto TEL Search  : [No ]          |
| TA Busy Ch LOut  : [No ]          |
| Wide/Narrow      : [Wide ]        |
| Fix ID            1st    2nd      |
|  ID              : [   ] [   ]    |
|  Call Indicator  : [***] [***]    |
|  Horn Alert      : [***] [***]    |
|  Opt Signalling  : [****] [****]  |
| Block ID's        Start   Stop    |
|  Telephone       : [    -     ]   |
|  TX Inhibit      : [    -     ]   |
|  Decode          : [    -     ]   |
| Data System/Group : [  1 -  2 ] ◄─────  Set Data System/Group to the
| Data Delay Time   : [ 15]ms       |       Voice System/Group number.
+-----------------------------------+
```

Select the voice group and press *F10* to setup *Group Data.*

```
+--------------------------------+
|          Group Data 2          |
|--------------------------------|
| Encode ID        : [ 2 ]       |
| Decode ID        : [ 2 ]       |
| Group Name       : [Voice    ] |
| TX Power         : [High]      |
| Call Indicator   : [No ]       |
| Horn Alert       : [No ]       |
| Option Signalling : [None]     |
| Group-Lockout    : [No ]       |
| Transpond        : [No ]       |
| Talk Around      : [No ]       |
| Compander        : [***]       |
| Home Group       : [***]       |
| PTT ID           : [Off]       |
| Data             : [Yes] ◄─────     Data = Yes on voice group
+--------------------------------+
```

From the *Edit* pull down menu, select *Scan Information*. Set *Dwell* Time to *0 Seconds*.

```
+------------------------------------------+
|             Scan Information             |
|------------------------------------------|
| Scan Type         : [Fix System Scan   ] |
| Revert Sys Type   : [Last Called]        |
| Dropout Delay Time : [  3]s              |
| Dwell Time        : [  0]s ◄─────    Set Dwell Time to 0 Sec.
| Look Back Time A   : [0.50]s             |
| Look Back Time B   : [2.00]s             |
| Revert Grp Display : [Off]               |
| Off Hook Scan     : [Disable]            |
+------------------------------------------+
```

Wiring the Pyramid to the Kenwood TK-x80

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

Connecting the 2012/Merlin MDT to the TK-x80 radio

The following are the pin outs for the KCT-19 option connector of the TK-x80 series radios. These connections must be made to the corresponding color-coded cable from the 2012/Merlin. **Install the KCT-19 "E" plug into CN-2.**

Connections: 2012/Merlin	Function	Radio
Black/Shield	Ground	KCT-19 Pin 6
White	Tx Audio Out	KCT-19 Pin 9
Blue	On-Air Detect	KCT-19 Pin 5
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 15

Jumper Settings in the 2012/Merlin

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

Connecting the 2016 base to the TK-x80 radio

The following are the pin outs for the KCT-19 option connector of the TK-x80 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 5
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 15
Teal	Base Chan. Chg. Enable	Ground

Supporting the Kenwood KDS-100 /w Merlin AVL

Modifications To Kenwood TK-x80 Mobile Radio

When you are installing both a KDS-200 Data Head and a Merlin 2017 AVL unit onto the same radio, some modifications have to be made to get all proper signals to the KCT-19 connector. When you are connecting a KDS-100 without a Merlin AVL unit to a radio, you normally use a KCT-34 option connector. In this case you will be using a KCT-19 option connector kit. You will have to perform the following modifications to the KCT-19/Radio to connect all required signals to the KCT-19 output:

1) Remove the *Red* wire from pin 2 of CN1 and solder this wire to pin 3 of CN2 in the TK-x80 radio.
2) Remove the *Orange* wire from pin 3 of CN1 and solder this wire to pin 2 of CN2 in the TK-x80 radio.
3) Be sure to install the "E" lead of the KCT-19 into CN-4 of the TK-x80 radio.

Once the above modifications are complete, you will have all necessary signals available for both the KDS-100 and the Merlin AVL at the KCT-19 15 pin connector. From this point you will need to install the 7525-10-1044 "Y" cable to split the necessary signals between the KDS-100 and the Merlin AVL. Plug the 7525-10-1044 "Y" cable into the KCT-19 from the radio.

KDS-100 Modifications

The KDS-100 connects to the KDS-100 side of this 7525-10-1044 "Y" cable. Your KDS-100 will need to be programmed for "PC" mode.

Merlin AVL Modifications

The Merlin connects to the 2017 Merlin side of the 7525-10-1044 "Y" cable. No changes are made to the interface of the Merlin AVL to the KCT-19 vs. the interface of a Merlin AVL to a 7525-10-1044 "Y" cable.

1) Rather then inserting the Grey wire from the Merlin AVL into pin 15 of the Kenwood Connector, Insert the *Grey* wire from the Merlin AVL into pin 1 of the Kenwood Connector.

Modifications To Kenwood TK-x80 Base Radio

When you are installing both a 2016 Base Modem and the interface to the PC for FleetSync Data, some modifications have to be made to get all proper signals to the KCT-19 connector. You will have to perform the following modification to the KCT-19/Radio to connect all required signals to the KCT-19 output:

1) Remove the **Red** wire from pin 2 of CN1 and solder this wire to pin 3 of CN2 in the TK-x80 radio.
2) Be sure to install the "E" lead of the KCT-19 into CN-4 of the TK-x80 radio.

Once the above modifications are complete, you will have all necessary signals available for both the 2016 Base Modem.

*Note: With this modification, instead of inserting the **Grey** wire from the Merlin AVL into pin 15 of the Kenwood Connector, Insert the **Grey** wire from the Merlin AVL into pin 1 of the Kenwood Connector.*

From this point you will be feeding your PC with two separate serial data signals, one from the 2016 base modem and one from the PC output of the TK-x80 radio, providing the FleetSync data to the PC.