TELEX Application Note

Kenwood Radio
Series TK-x80, -x90, -x150, -x180 and TK-5x10
To IP-223 Remote Adapter Panel

VOIProven TELEX Radio Dispatch

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Kenwood Radio Series TK-x80, -x90, -x150, -x180 and TK-5x10 to IP-223 Remote Adapter Panel

1.0 General

This application note is intended to assist technical staff with the creation of IP-223 interface to Kenwood TK-x80, TK-x90, TK-x150, TK-x180, TK-5x10 series radios. This application note applies to IP-223 PCB PN 750630 revision F and all versions of PCB PN 750743.

REFERENCE: For earlier revisions of IP-223 PCB 750630, contact technical support, see “Technical Support:” on page 22 for details.

The following optional Telex cables can help speed installation:

- P/N 301956000 IP223CAB150/180 - IP223-Kenwood TK-150/180 and TK-5x70 cable.
- P/N 301957000 IP223CAB90 - IP223-Kenwood TK-90 cable.

If attaching two (2) serially controlled devices to a single IP-223, a serial port splitter cable is required:

- P/N 301953000 IP223DB9Splitter - Serial Port splitter cable DB-9.

2.0 Cable Assembly

2.1 TK-x80 Model Cable Assembly

Table 1 shows connectivity for the IP-223 to TK-x80 audio cable. This cable is manufactured from a Kenwood KCT-19 accessory cable.

Table 1: IP-223 to TK-x80 Audio Cable

Signal	IP-223 DB-25	KCT-19 Accessory Connector
Ground	7	6
PTT Common	2	6
PTT	14	8
COR	20	11
RX+	24	12
TX+	25	5

Table 2 shows IP-223 to TX-x80 serial connectivity.

NOTE: The E connector, within the radio, is connected to CN4 in order to establish serial communication

Table 2: IP-223 to TK-x80 Serial Cable

IP-223 Serial Signal	IP-223 DB-9		KCT-19 Accessory Connector
	Line 1	Line 2	
TXD	9	4	14
RXD	1	6	15

2.2 TK-x90 Model Cable Assembly

Table 3 and Table 4 show IP-223 to TK-x90 audio and serial cable connections, respectively.

Table 3: DB-25 Audio Cable Assy—TK-x90

Signal	IP-223 DB-25	TK-x90 Radio DB-25
Ground	7	7
PTT Common	2	7
PTT	14	2 Aux Input (Programmable)
COR	20	20 AOI (Programmable)
RX+	24	17
TX+	25	13

Table 4: DB-9 Serial Cable Assy—TK-x90

IP-223 Serial Signal	IP-223 DB-9		TK-x90 Radio DB25
	Line 1	Line 2	
TXD	9	4	10
RXD	1	6	9

2.3 TK-x150/-x180/-5x10 Model Cable Assembly

Table 5 shows connectivity for the IP-223 to TK-[XXXX] audio cable. Table 6 shows the serial control cable.

Table 5: DB-25 Audio Cable Assy—TK-x150

Signal	IP-223 DB-25	TK-[XXXX] Radio DB-25
Ground	7	7
PTT Common	2	7
PTT	14	12 (Aux Input 4 Programmable)
COR	20[a]	20 (Aux Output 1 Programmable)
RX+	24	17
TX+	25	6

a. There are differences between the TK-x150 and TK-x180 radio's DB-25 connectors:

- If COR is used, then pin 20 (TK-x150 an output only) is programmed for that function and the cable routes that signal to the IP-223.
- On the TK-x180 the same pin is a general purpose I/O and has an additional 470 Ohm series resistance added. This requires the IP-223 external pull-up resistance must be removed. Jumpers J8 (Line 1) and J30 (Line 2) should be placed in a neutral position (neither A nor B, hanging).

For more information, see "IP-223 Jumper Settings" on page 12.

Table 6: DB-9 Serial Cable Assy—TK-x150

IP-223 Serial Signal	IP-223 DB-9		TK-[XXXX] Radio DB-25
	Line 1	Line 2	
TXD	2	8	2
RXD	3	7	3

3.0 IP223 Configuration

The IP-223 firmware version 4.000 or later is required to control a Kenwood TK-5x10 radio.

REFERENCE: Download firmware at http://www.telex.com/RadioDispatch/Default.aspx.

These configuration instructions use **TSM** (Telex System Manager) to configure the IP-223; however, the IP-223 can also be configured with the web browser configuration windows.

3.1 General Gain Configuration

The **General Gain** page, shown in Figure 1, is used to configure Tx gain.

To **configure the general gain**, do the following:

1. Open **TSM**.
2. Click the **General Gain** tab.
   The General Gain page appears.
3. From the Tx Gain drop down menu, select **-28dB** for the line(s) to configure.

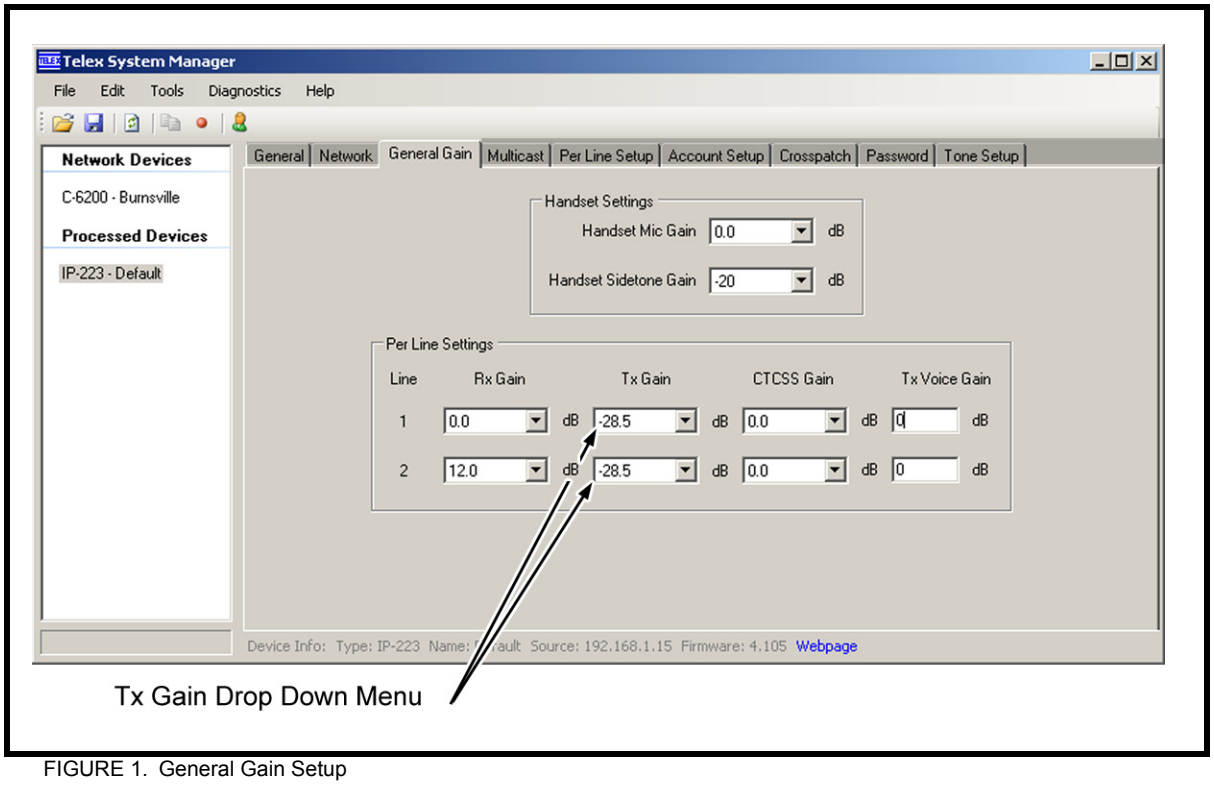

FIGURE 1. General Gain Setup

3.2 Multicast Configuration

The **Multicast** page, shown in Figure 2, is used to configure the line type.

To **configure Multicast**, do the following:

1. From TSM, click the **Multicast** tab.
   The Multicast page appears.
2. Select the **Enabled** check box for the line(s) you are configuring.
3. From the Type drop down menu, select **Local Mode**.
4. In the Line Name field, enter a **12-character name** for the line you are configuring.

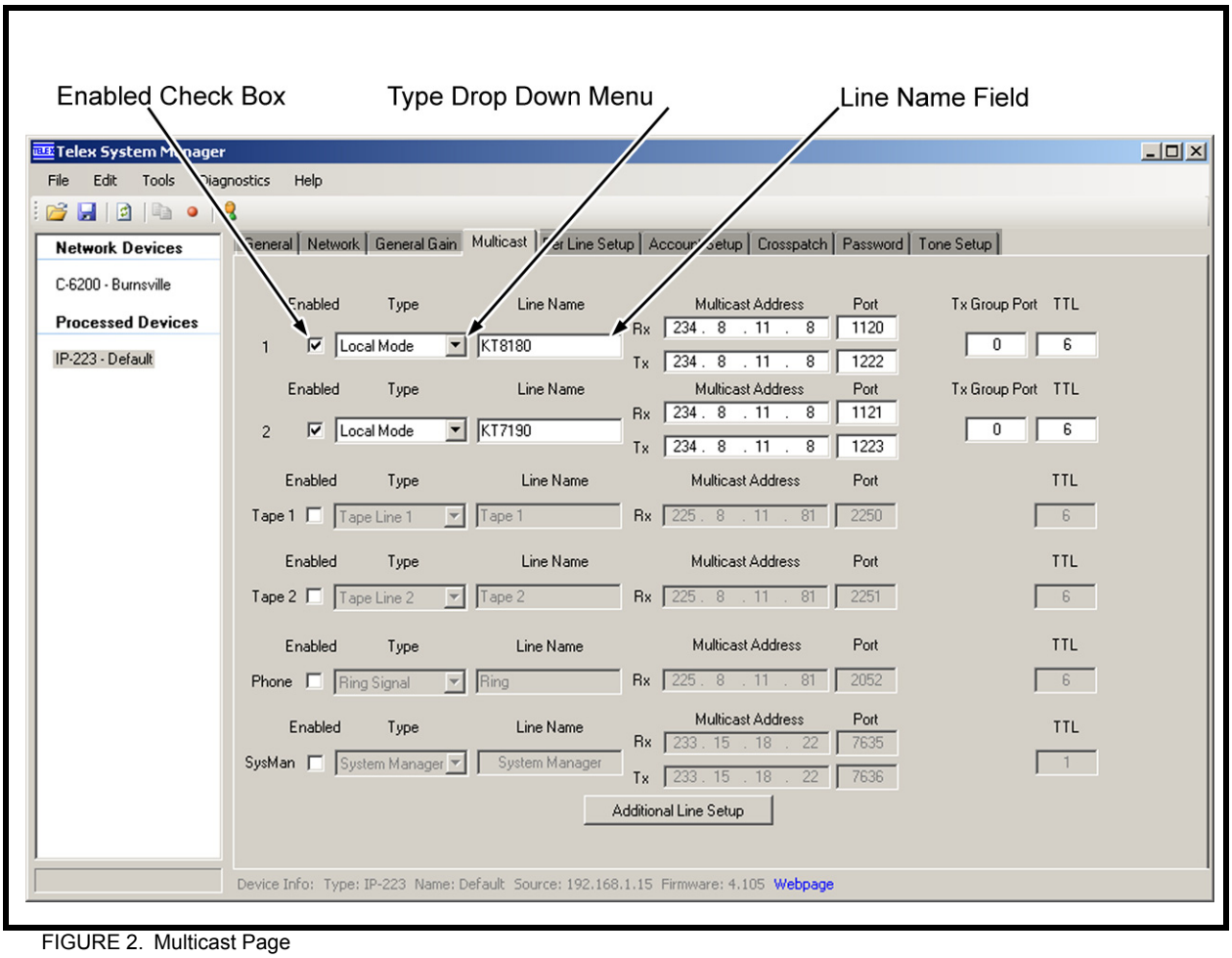

FIGURE 2. Multicast Page

3.3 Per Line Configuration

The **Options** page, shown in Figure 3, is used to configure the COR and Serial port mode.

To **configure the Per Line settings**, do the following:

1. Open **TSM**.
2. Click the **Options** tab.
   The Options page appears.
3. Select the **COR Enabled** check box.
4. From the Serial Port Mode drop down menu, select **Fleetsync x180**.

To **configure the console to reject channels from the radio's scan list**, do the following:

> Select the **Scan List** check box.

NOTE: All models can be used in scan mode, but the TK-x90 does not pass the active channel number back to the console.

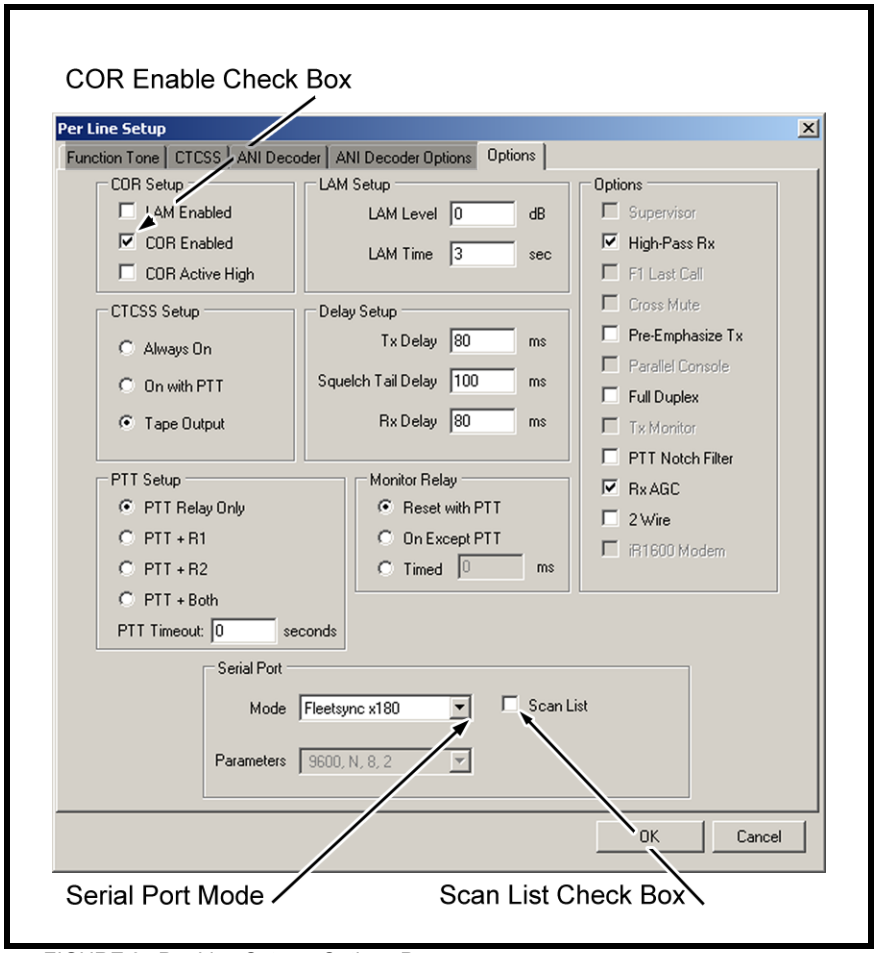

FIGURE 3. Per Line Setup—Options Page

3.4 Per Line Function Tone Configuration

The **Function Tone** page is used to enable the function tones.

1. From TSM, click the **Function Tone** tab.
   The Function Tone page appears.
2. Select the **Enable** check box for all channels to be accessed by the IP-223.

NOTE: By selecting all 10 function tone Enable check boxes, 100 function tones are available for configuration.

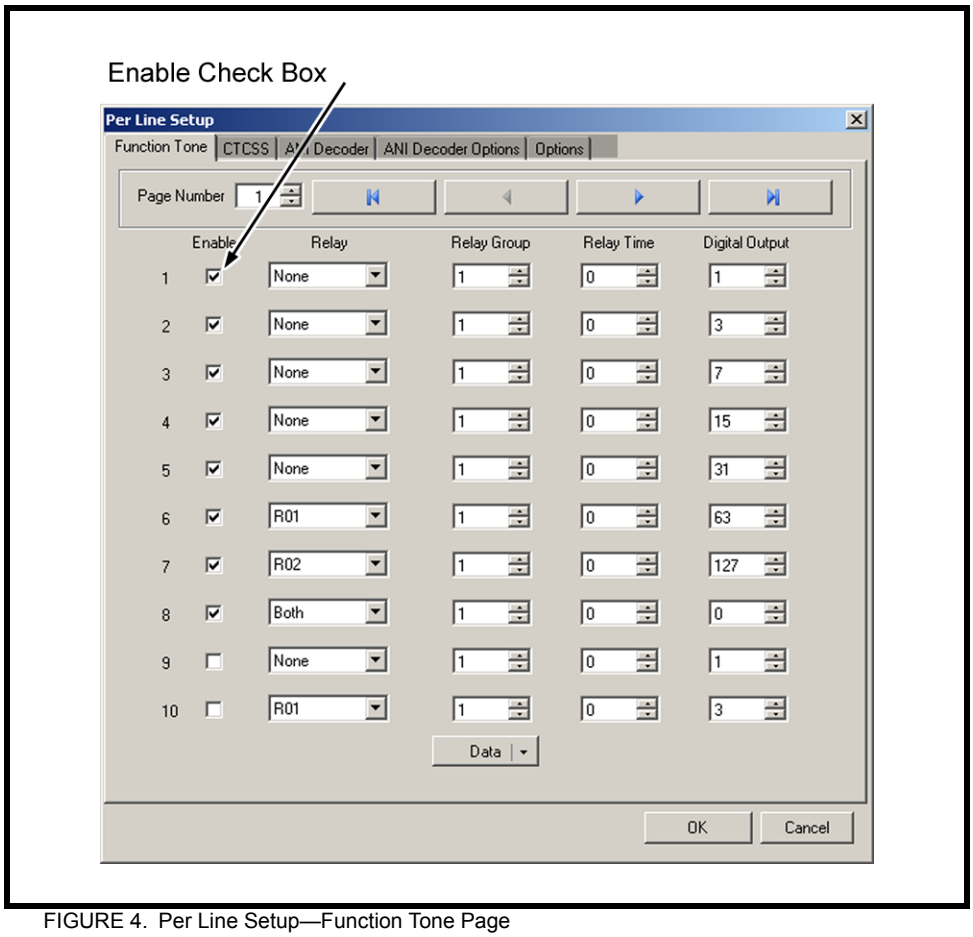

FIGURE 4. Per Line Setup—Function Tone Page

3.5 Per Line CTCSS Configuration

The **CTCSS** (Continuous Tone-Coded Squelch System) page is used to configure the function tone's radio system and to activate channels. The default system and channel values are automatically filled in the System and Channel fields.

The example shown in Figure 5 indicates function tones 1–8 are allowed access to system 1 and each function tone 1–8 is allowed access to its corresponding channel.

NOTE: By selecting all 10 function tone Enable check boxes, 100 F-tones are available for configuration.

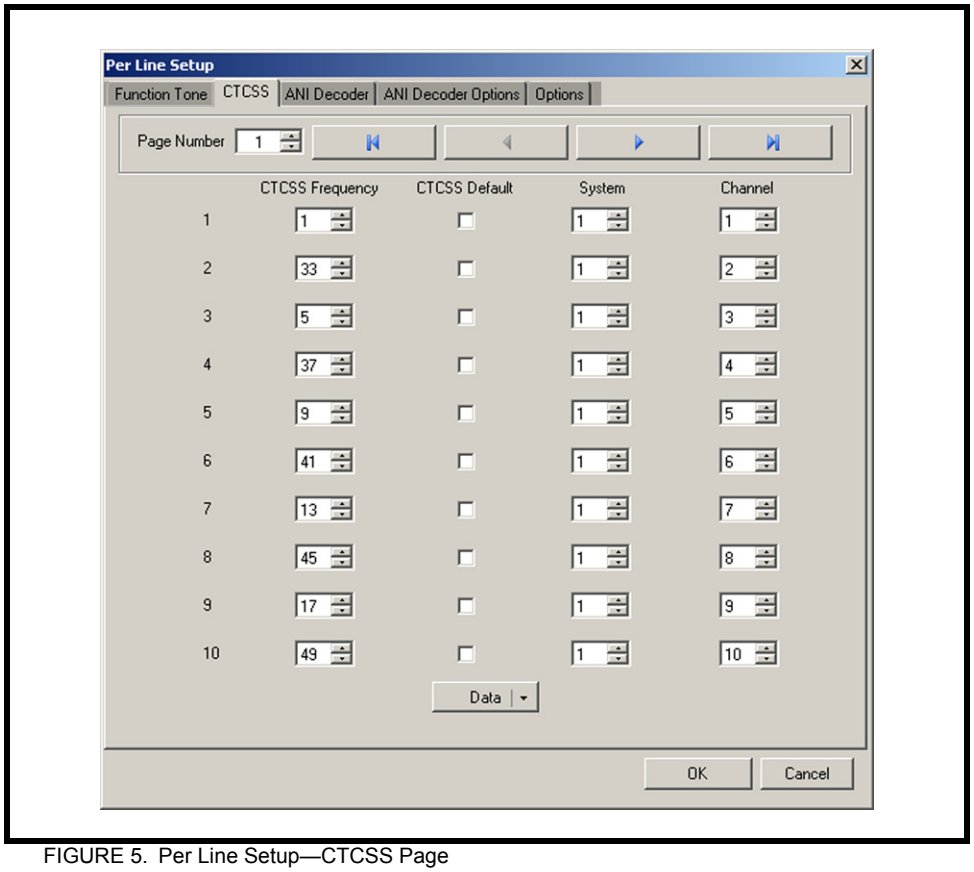

FIGURE 5. Per Line Setup—CTCSS Page

3.6 IP-223 Jumper Settings

The IP-223 jumper settings are as follows.

Table 7: IP-223 Jumper Settings

Line 1	Jumper Setting	Line 2
J33, J34	B = 4-wire	J5, J6
J16, J21	A = Single ended	J19, J20
J14	A = 600 Ohms	J24
J3, J9, J11	A = Single ended	J25, J28, J29
J13	B = High	J27
J17, J22	B = 600 Ohms	J10, J15
J35[a]	B = TK-x80 B = TK-x90	J26
	A = TK-x180 A = TK-x190 A = TK7510 A = TK8510	
J8	Neutral = External Pull-up[b]	J30

a. For TK-x80 and -x90, place jumper J35 (Line 1) and J26 (Line 2) in the B position. For TK-180, -x190/7510/8510, place these jumpers into the A position.

b. If TK-x180 employs COR (pin 20 in the IP-223 to TK-x180 audio cable), then the IP-223 external pull-up resistance must be removed. Jumpers J8 (line 1) and J30 (line 2) should be placed in a neutral position (neither A nor B, hanging).

4.0 Radio Configuration

4.1 TK-x80 Series Radio Configuration

To **configure the radio**, do the following:

> Program **Com 1** for DATA and **Com 2** for AUX Hook/PTT. See Figure 6.

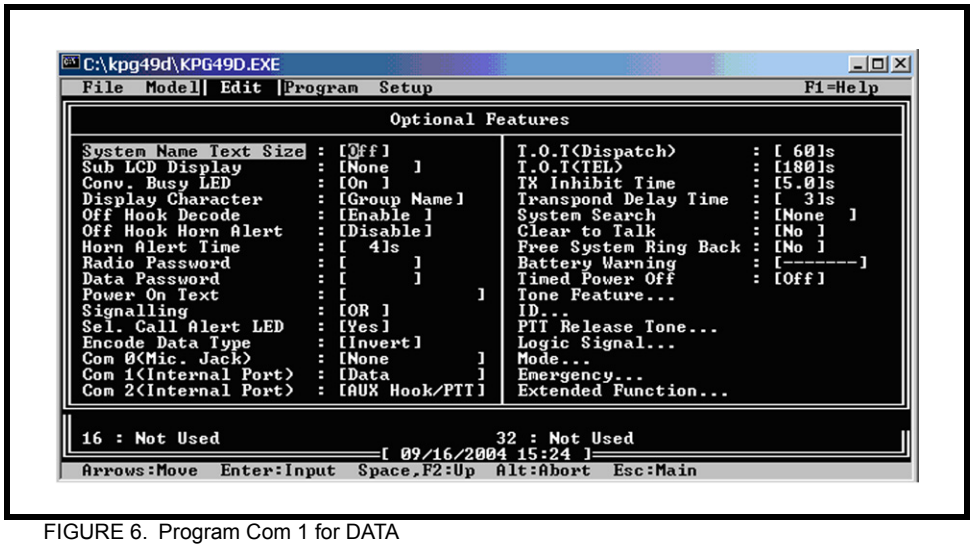

FIGURE 6. Program Com 1 for DATA

4.2 TK-80 Series Radio Modifications

To **modify the radio settings**, do the following

> Move **R94 to R24 position**, see Kenwood TK-80 series manual, section 1.3, for more details.

4.3 TK-x90 Series Radio Configuration

To **configure the radio**, do the following:

1. Program **Function Port window** for Ext PTT in Radio 1 AI1. See Figure 7.

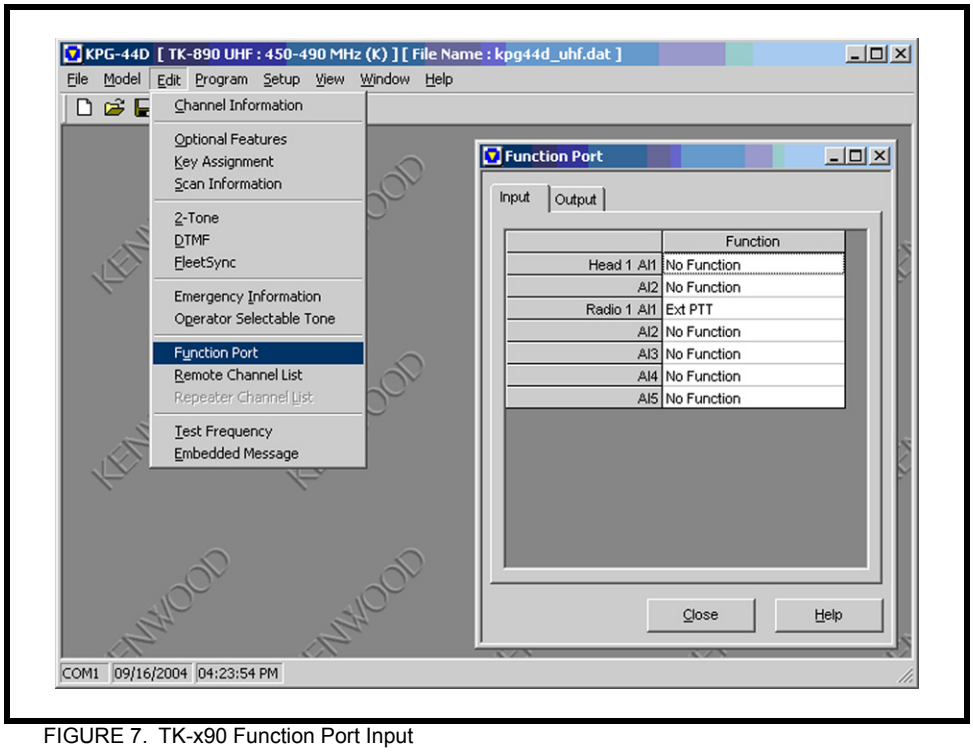

FIGURE 7. TK-x90 Function Port Input

2. Program **Function Port window** for COR in Radio 1 AO1. See Figure 8.

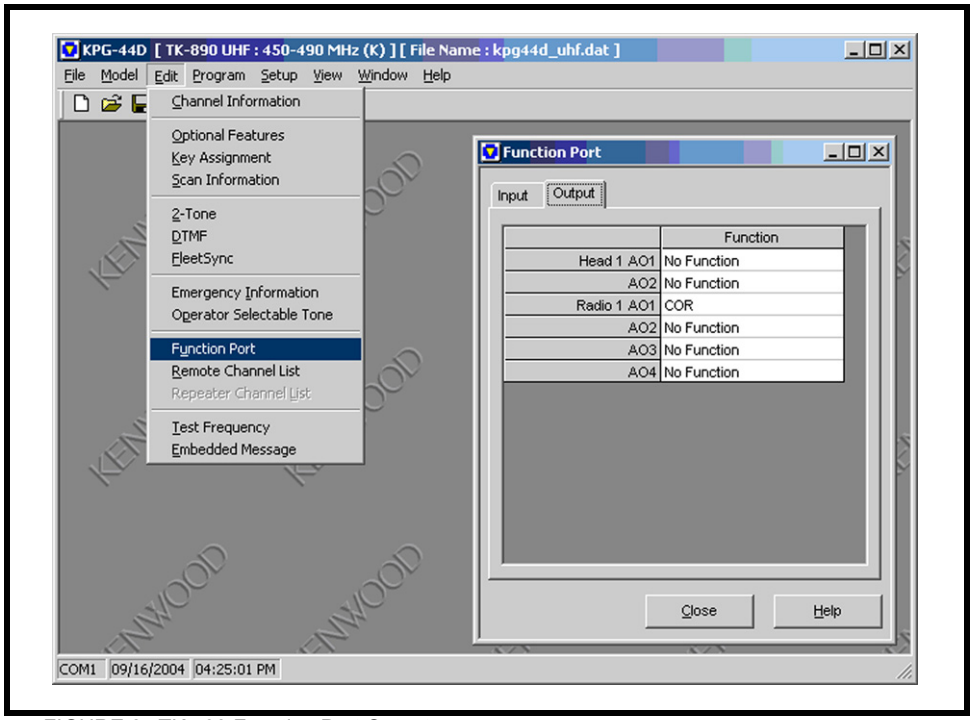

FIGURE 8. TK-x90 Function Port Output

The radio ships with pin 13 in *DATA*. The internal configuration for pin 13 must be modified.

To **configure pin 13,** do the following:

> Set pin 13 by relocating R641 to R640 for **Mic signal input**.

REFERENCE: For more information, see the manufacturer's technical manual Accessory Terminal Function section (R640 R641 Function).

4.4 TK-x150/180 Series Radio Configuration

To **configure the radio**, do the following:

1. Program **Function Port, Aux Input** for External PTT in AUX Input 4 location and COR in AUX Output1. See Figure 9.

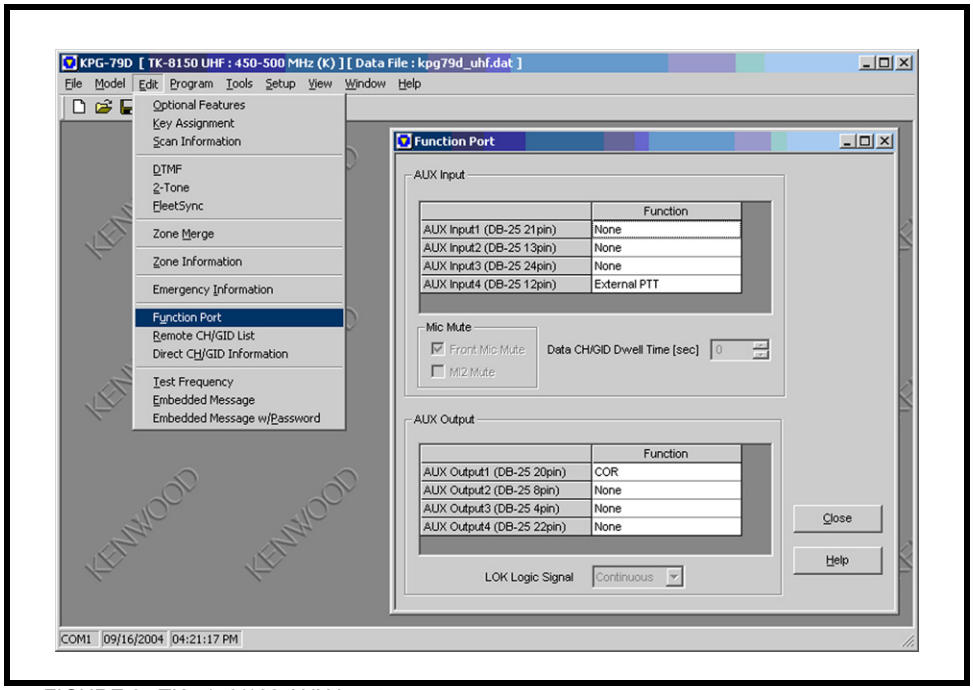

FIGURE 9. TK-x150/180 AUX Input

2. Program **Com 1** for DATA. See Figure 10.

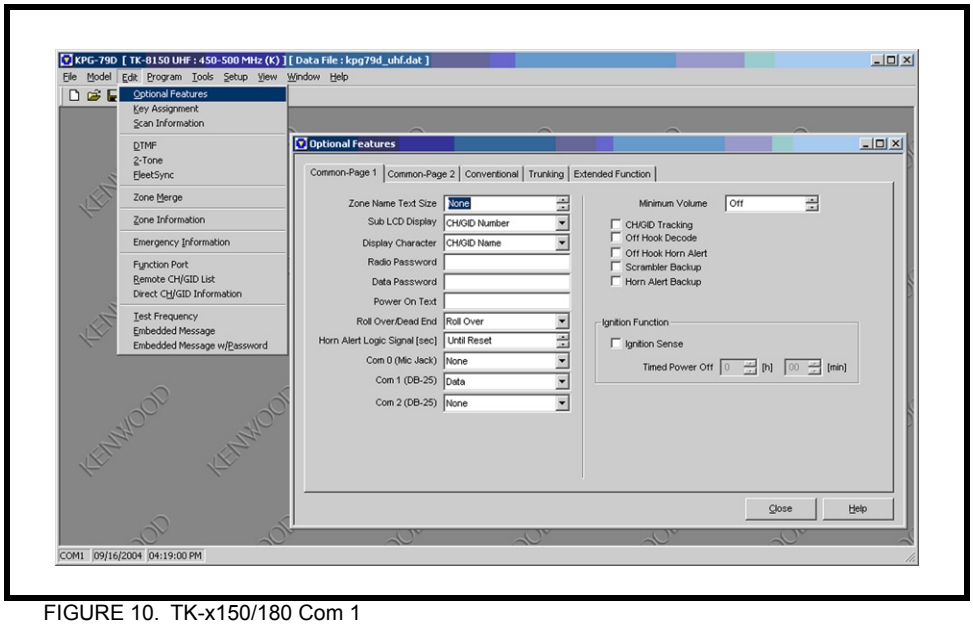

FIGURE 10. TK-x150/180 Com 1

NOTE: For the TK-x180, the AUX programming window is different. The same interface cable is used for both the TK-x150 and TK-x180 radios. If COR is used, IP-223 Jumper 8 (Line 1) or Jumper 30 (Line 2) needs to be placed in a neutral position for the Aux port pin 20 on the TK-x180 to function properly as COR. See Figure 11.

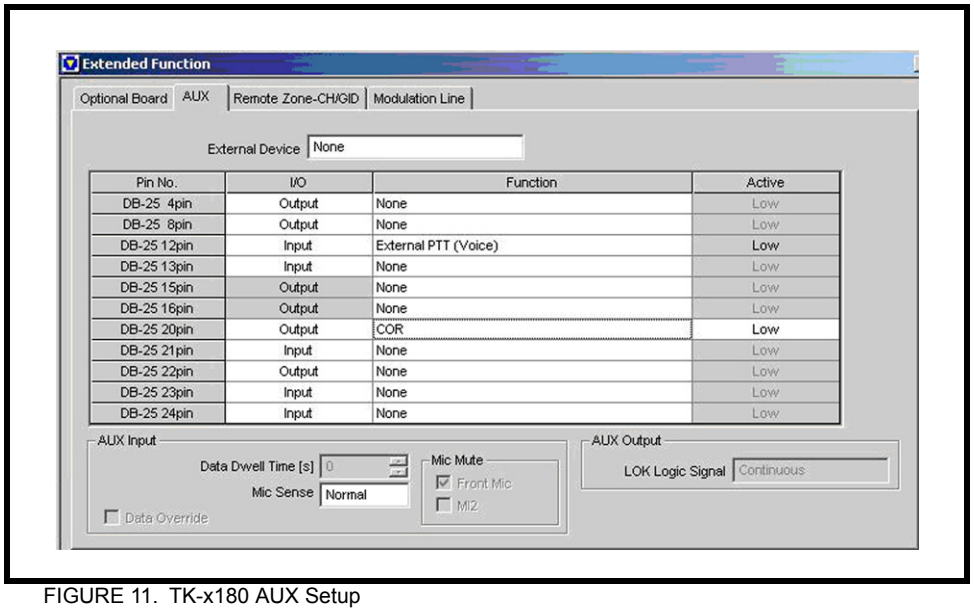

FIGURE 11. TK-x180 AUX Setup

4.5 TK-5x10 Series Radio Configuration

The TK-5x10 series radios must be configured using Kenwood version 5 software.

4.5.1 Extended Functions Configuration

To **configure extended functions**, do the following:

1. Open the **Kenwood KPG-95D (version 5) configuration software**.
2. Select **Tools|Extended Functions** from the menu bar.
   The Extended Functions window appears.
3. From the Extended Functions window, select the **AUX** tab.
4. In the function field for pin 12, enter, **External PTT (Voice)**.
5. In the function field for pin 20, enter **COR**.
6. Click **Close**.

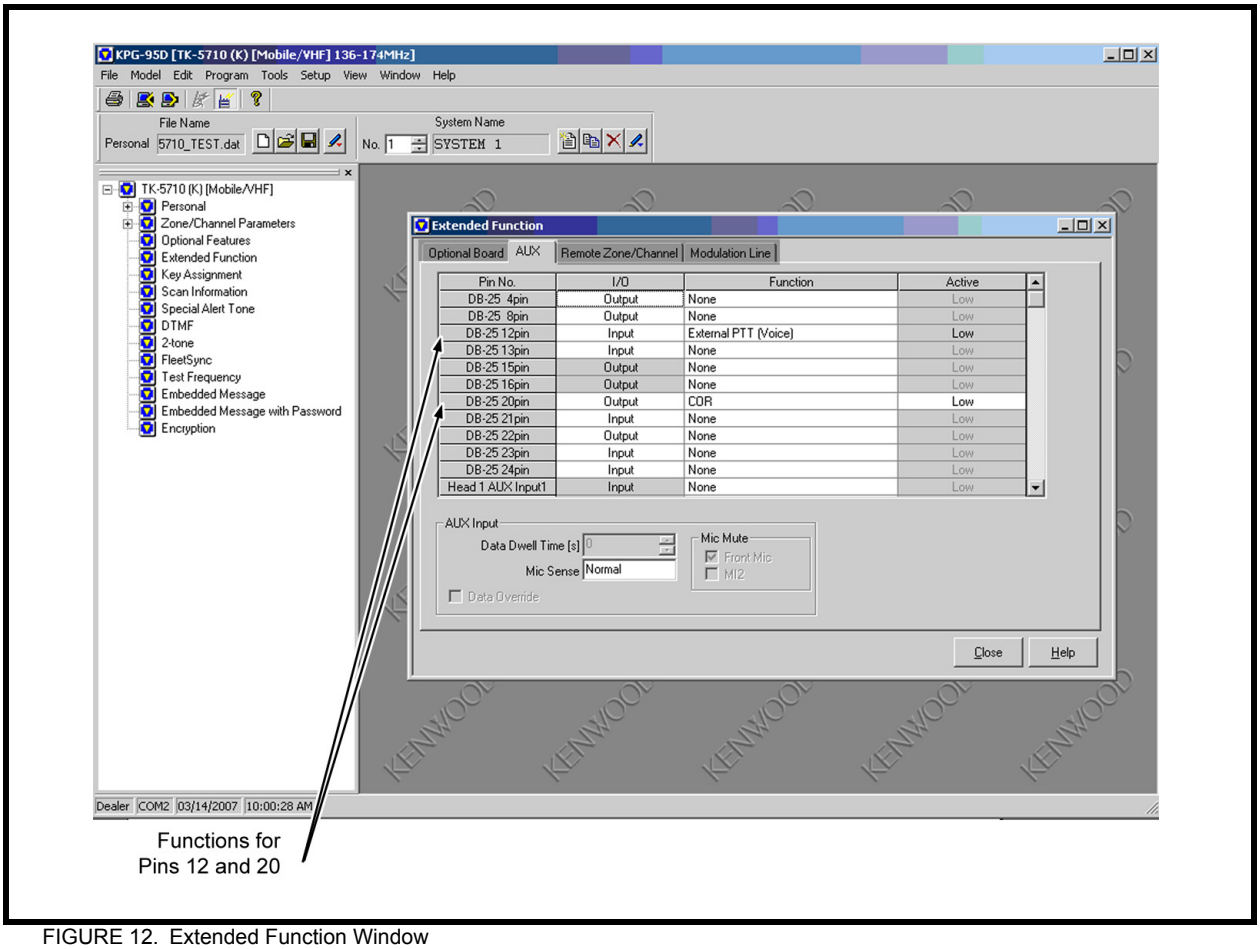

FIGURE 12. Extended Function Window

4.5.2 Optional Features Configuration

To **configure optional features**, do the following:

1. Open the **Kenwood KPG-95D (version 5) configuration software**.
2. Select **Tools|Extended Functions** from the menu bar.
   The Extended Functions window appears.
3. Select the **Common Page 3** tab.
4. In the Function field for COM port 1, enter **Data**.
5. In the Polarity field for COM port 1, enter **Normal**.
6. In the Stop Bit field for COM port 1, enter **2**.
7. In the Baud Rate field for COM port 1, enter **9600**.
8. Click **Close**.

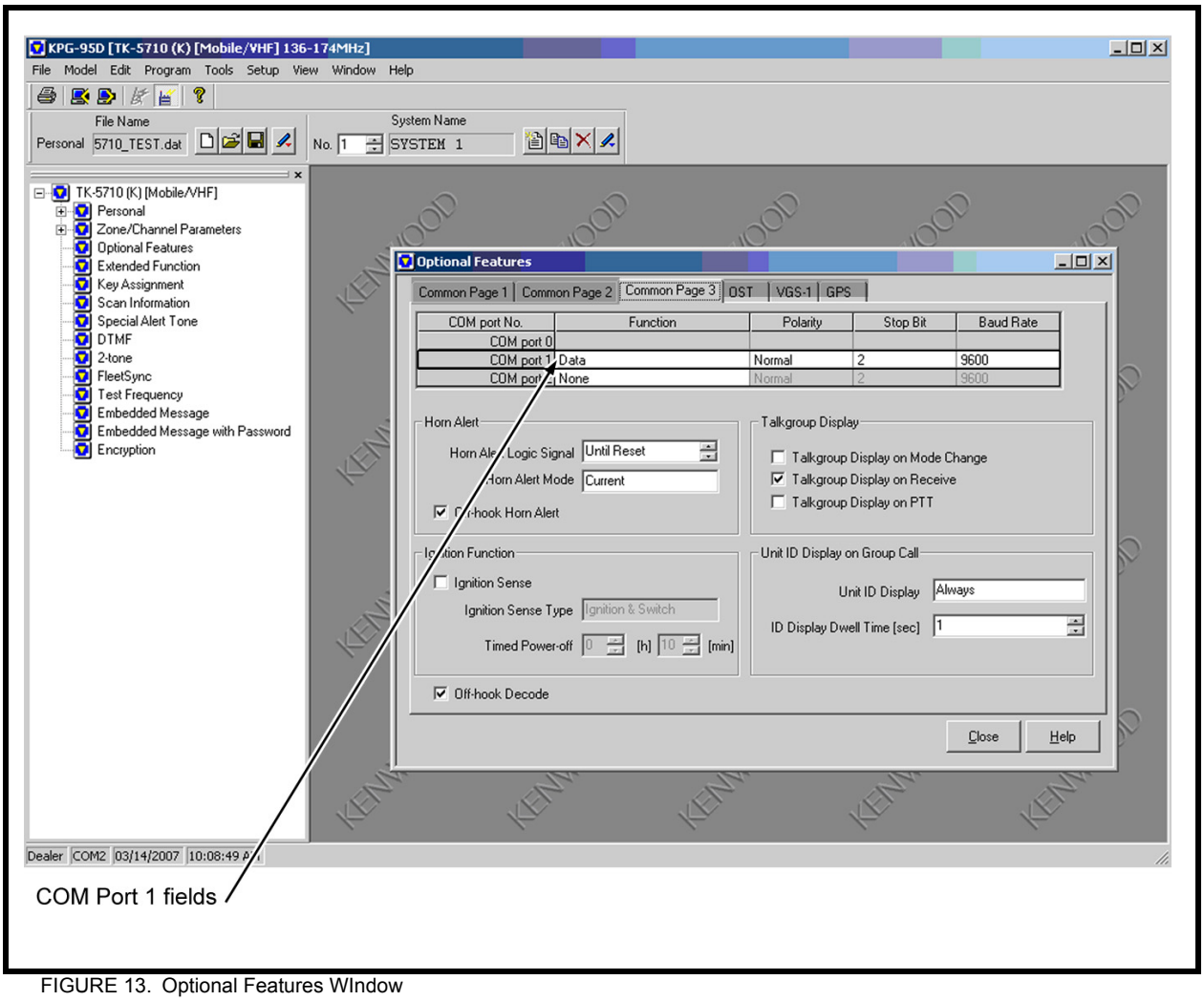

FIGURE 13. Optional Features WIndow

4.5.3 Configure Scan Information

To **configure Scan Information**, do the following:

1. Open the **Kenwood KPG-95D (version 5) configuration software**.
2. Select **Tools|Scan Information** from the menu bar.
   The Scan Information window appears.
3. Select the **Options** tab.
4. Select the **Off-hook Scan** check box.
5. Click **Close**.

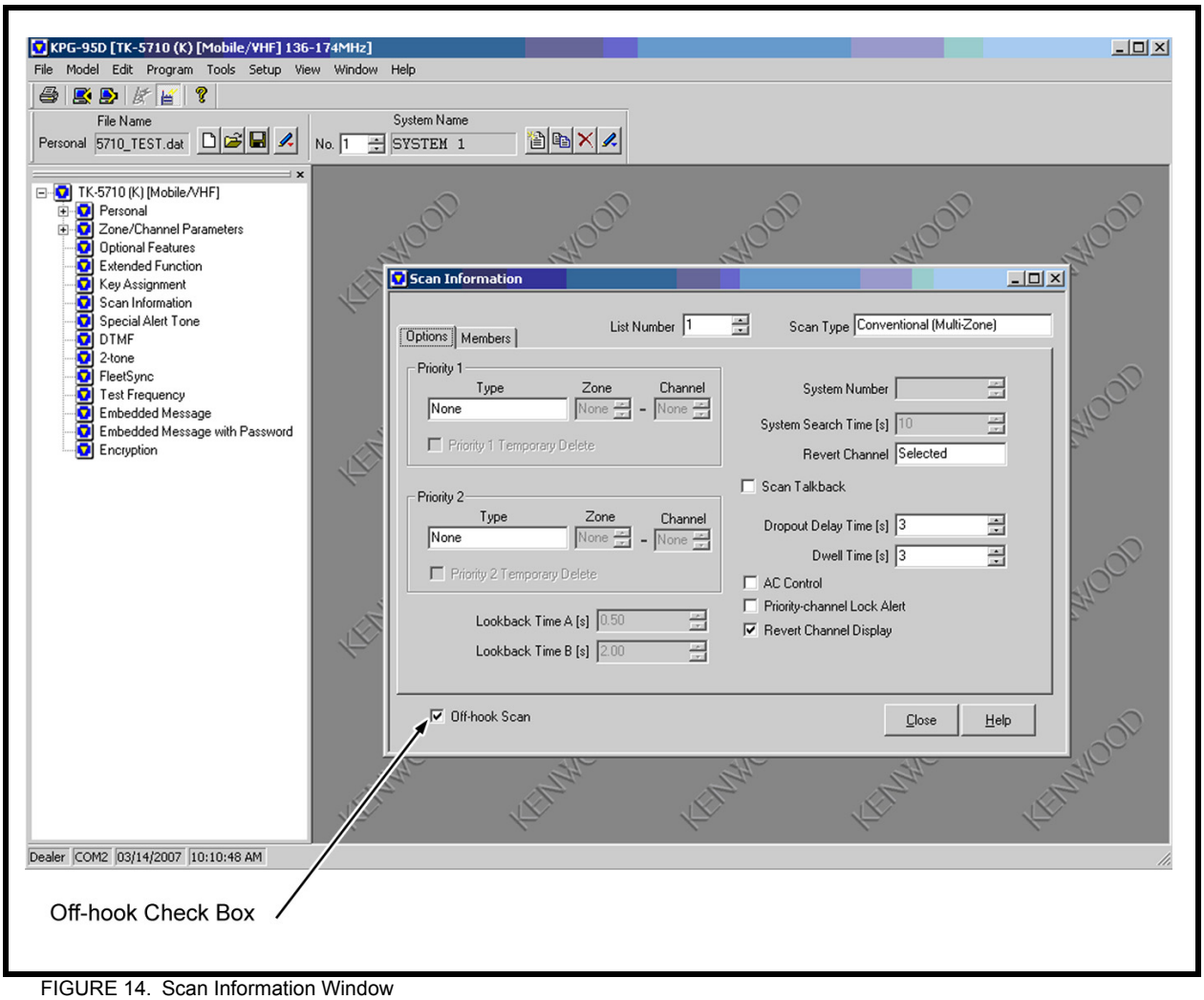

FIGURE 14. Scan Information Window

Notes:

Revision History		
Document Title: Kenwood Radio Series TK-x80, -x90 and -x150, -x180 and TK-5x10 to IP-223 Remote Adapter Panel		
Document Number: AN-DISPATCH-001		
Revision	**Change Description**	**Date**
A	Update brand, format and new document number. (Reference rev D)	30-OCT-2009
B	Update section 4.1 and add section 4.2 called Radio Modifications	30-AUG-2012

Suggestions or comments:
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