CODAN

HF Data Modem
3112

USER GUIDE

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HF Data Modem 3112 User Guide

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Introduction

Thank you for purchasing a Codan 3112 HF Data Modem. With this great product and Codan's supreme after-sales support, you can look forward to many years of reliable HF data communication. Please read this guide thoroughly and retain it for future reference. There is an index at the end of this guide to assist you in finding information.

Overview of this guide

This guide is for technicians who install the hardware, and system administrators who set up how the HF data communication network interacts with other equipment. It provides instructions on how to connect and set up a 3112 HF Data Modem with a Codan HF transceiver that is capable of high-speed data transfer.

This guide assumes that the system administrator is familiar with setting up HF communication networks for the Codan NGT series Transceiver and 2110 Manpack Transceiver.

This guide contains the following sections:

Appendix A   Menu structures for waveforms—details the menu structure for each type of waveform that may be used with the 3112

Appendix B   Connectors—details the pinouts of each connector on the 3112

Appendix C   Specifications—provides the common operational specifications for the 3112

Appendix D   Factory-default settings—provides a list of the default settings for each menu option and the default waveform

Appendix E   Compliance—provides compliance information and safety notices for your modem

Appendix F   Definitions—explains the terms and abbreviations used in this guide

1   Overview

This section contains the following topics:

The 3112 HF Data Modem

The 3112 HF Data Modem provides a robust method of data communication over an HF path.

A standard Codan HF data station (or node) comprises:

*   a Codan HF transceiver that is capable of high-speed data transfer

*   an antenna system

*   an appropriate 12 V DC power supply

*   a 3112 HF Data Modem

*   a PC with terminal software

NOTE
The 3112 HF Data Modem can operate with a standard data-capable Codan HF transceiver, however it will operate below the optimum data transfer rate of 9600 bps.

A typical installation uses:

*   an Ethernet connection between the PC and the modem (see page 22, *Connecting the modem to the PC via the Ethernet ports*), or

*   three connections between COM and asynchronous/ synchronous ports on the PC and the modem (see page 31, *Connecting the modem to the PC via an asynchronous port* or page 38, *Connecting the modem to the PC via a synchronous port*)

Figure 1: Typical system layout
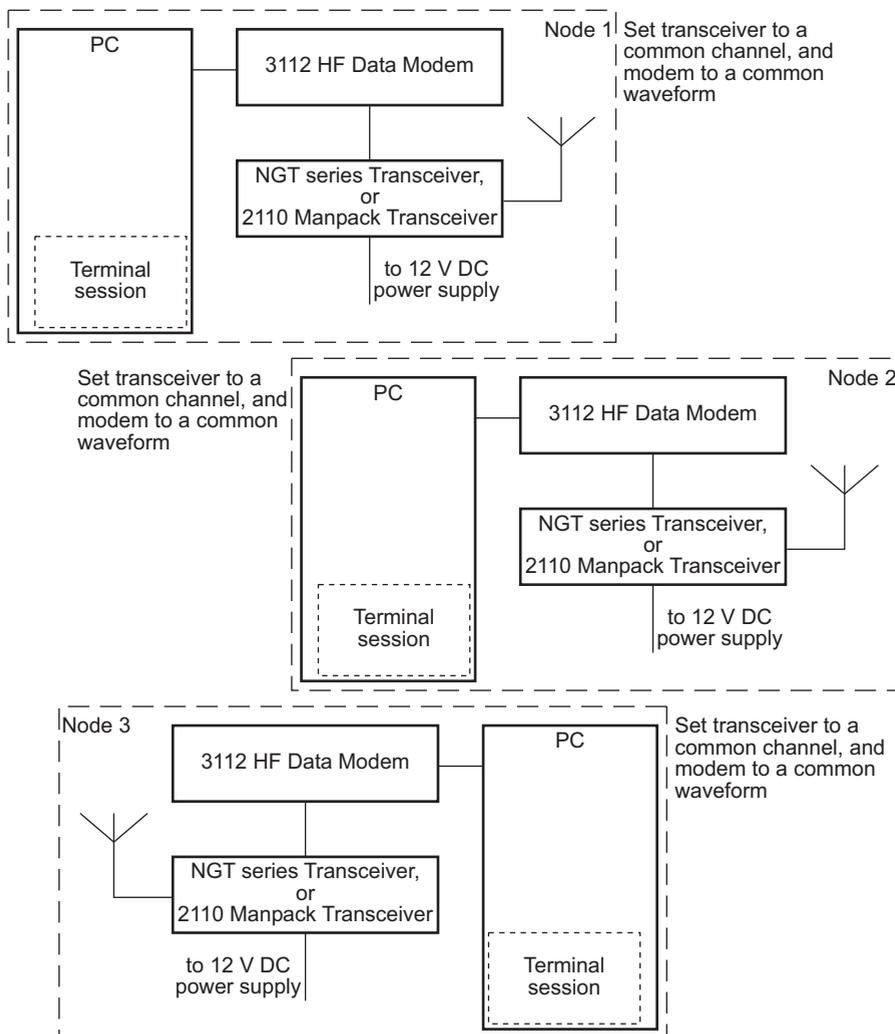
Figure 2: Typical system layout using the Codan STANAG 5066 Stack with HF Express
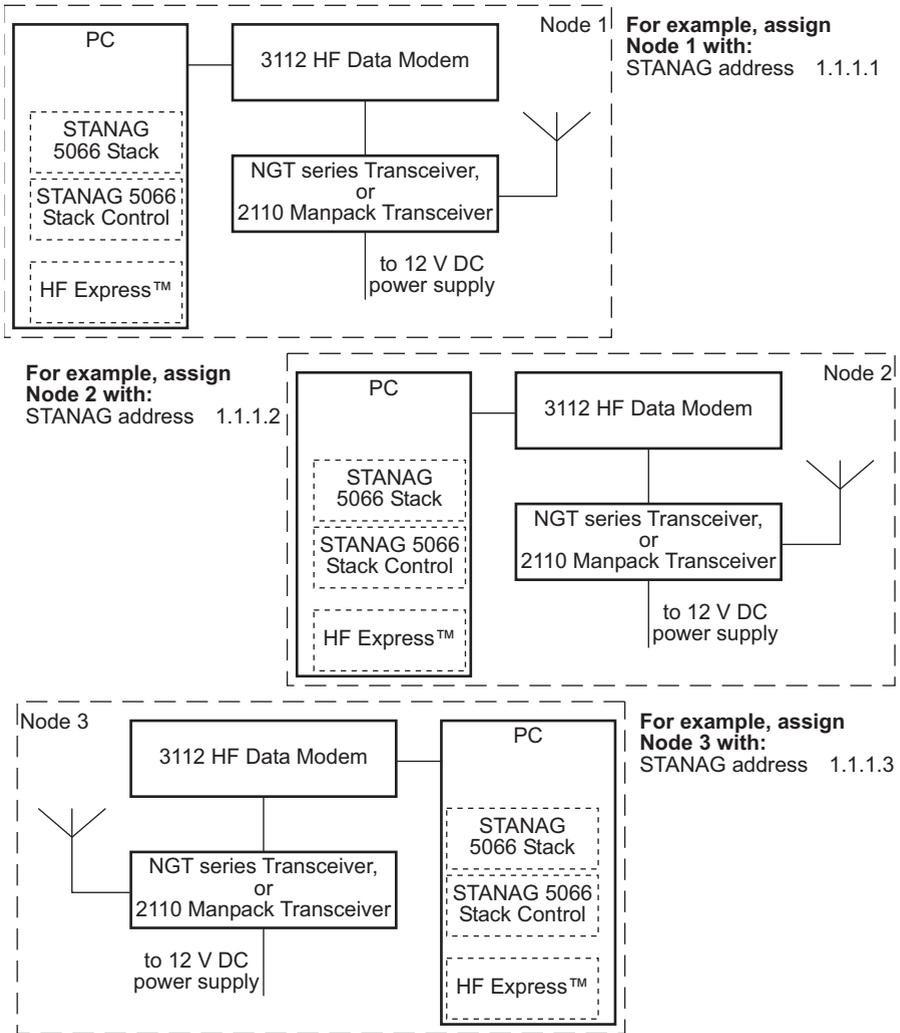
NOTE	For ALE use, the modem is assigned a self address. This is stored in the STANAG 5066 Stack against the corresponding STANAG address for the node. The self address for the modem should be different from the self address assigned to the transceiver.

Signal flow

For simple operation, the Codan HF transceivers must be manually set to the same channel, and the modems must be manually set to the same waveform. Data is passed from the terminal session to the modem. It is processed by the modem then sent to the Codan HF transceiver for transfer via HF to any transceivers tuned to that frequency. At the receiving node, the data is passed from the transceiver to the modem, where it is decoded, ready for presentation at the remote PC. Figure 1 on page 5 shows a typical layout for a data communication system.

When the modem operates under the control of the STANAG 5066 Stack, the data may be transferred via an ALE link, or via two transceivers manually set to the same channel. The STANAG 5066 Stack requires a STANAG address to be set for each node. Figure 2 on page 6 shows a typical layout for an HF data communication network that uses Codan's STANAG 5066 Stack and HF Express™.

If a modem self address and ALE/CALM network is defined against the STANAG address for the remote node in the STANAG 5066 Stack, the Codan HF transceivers establish the ALE link according to the information provided. If no modem self address or ALE/CALM network is defined against the STANAG address for the remote node, the transceivers must be manually set to the same channel before the data is transmitted.

The data from the PC is once again prepared by the modem, sent via HF on the set channel to the specified STANAG address, then passed to the modem for decoding and presentation at the remote PC.

The 3112 HF Data Modem indicates on its screen whether it is transmitting, receiving or idle. For information on screens that may appear see .

Power supply

The 3112 HF Data Modem is powered via its connection to the Codan HF transceiver. When the Codan HF transceiver is switched on, the connected modem is also switched on.

Alternatively, the 3112 HF Data Modem may be powered via an external DC power source that provides between 10 and 15 V DC.

Interoperability

The 3112 HF Data Modem supports the following waveforms:

- MIL-STD-188-110A
- MIL-STD-188-110B (serial tone)
- MIL-STD-188-110B (39Tone, parallel)
- STANAG 4539
- STANAG 4415

Operating modes

The modem has two operating modes:

- **LOC** mode: the modem is under local control
- **REM** mode: the modem is under remote control by the Codan STANAG 5066 Stack

The front panel

The front panel of the 3112 HF Data Modem comprises an LCD and six navigation buttons. For information on navigating through the menu structure see . For information on the menu structure see and . For information on screens that are displayed on the LCD see .

Figure 3: Front panel of the 3112
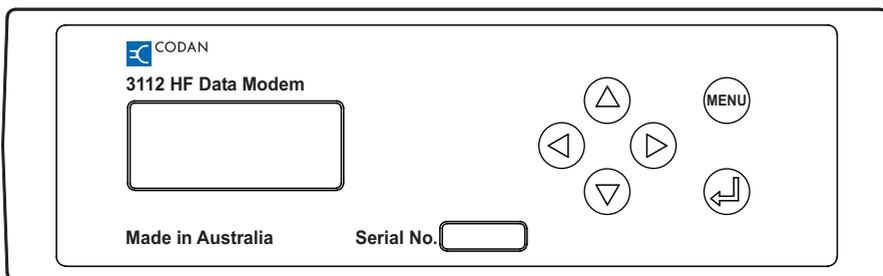
The rear panel

The rear panel of the 3112 has a standard Ethernet connector and four D-type connectors.

NOTE   For information on connector pinouts see page 75, *Connectors*.

Figure 4:   Rear panel of the 3112
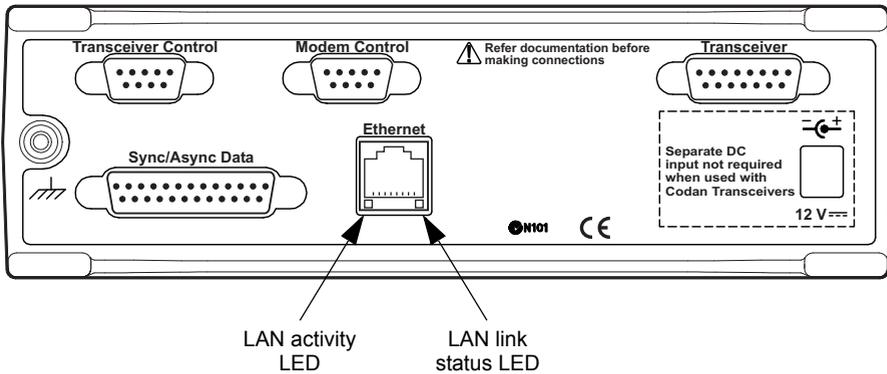
LAN activity   LAN link
LED   status LED

The **Transceiver Control** connector provides a connection between the modem and a COM port on the PC. This enables the operator to control the transceiver via a terminal session using CICS. For information on using these commands see *CICS* in the Reference Manual provided with the Codan HF transceiver.

The **Modem Control** connector provides a connection between the modem and a COM port on the PC. This enables the operator to control the modem using in-built Remote Control Protocol commands. For information on using these commands see page 66, *Using the on-board help in the modem*.

The **Sync/Async Data** connector provides a connection between the modem and the PC by either:

• a COM port (asynchronous mode), or

• a synchronous card (synchronous mode)

The **Ethernet** connector provides a standard Ethernet connection between the modem and the PC. This enables the operator to control the transceiver, modem and data port via terminal sessions. The data port operates in asynchronous mode. The connector has two LEDs: one for LAN activity, the other for the status of the link to the LAN.

The **Transceiver** connector provides the power, data and control connection between the modem and the Codan HF transceiver.

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2   Installation and setup

This section contains the following topics:

Unpacking the equipment

On receiving your 3112 HF Data Modem, check the contents against the packing list. Make sure that all equipment itemised on the packing list is present before you start installing the modem into your HF data communication network.

Open the packing case and examine the contents for signs of damage. If you notice any damage, contact Codan immediately for an RMA. Failure to contact Codan before returning the unit may result in any warranty being void.

We recommend that the equipment is installed by qualified and experienced personnel, to the relevant standards and approvals.

General

These installation instructions assume the following:

- The Codan HF transceiver, which is capable of high-speed data transfer, has an appropriate power supply and antenna system connected, and all modules within the transceiver system are functioning correctly.

- The HF data communication network is planned.

- If the modem and PC at a node are connected via their Ethernet ports and are *not* using DHCP, there must be an IP address assigned to both the modem and the PC. These IP addresses must use the same subnet.

> NOTE   IP addresses must be assigned by a system administrator who is knowledgable in IP addressing and networking.

If the HF data communication network is to be controlled entirely by the Codan STANAG 5066 Stack, then:

- Each node in the HF data communication network must have a STANAG address assigned to it.

- For ALE operation:

  - The Codan HF transceiver must contain an ALE/CALM network with channels and an appropriate self address.

  - The modem at each node must be assigned a self address that is different from the self address for the transceiver. The self address of the modem must be assigned to the STANAG address for the node, along with the name of the ALE/CALM network.

> NOTE   For information on setting up your HF data communication network for ALE operation see the *STANAG 5066 Stack Help*.

Once installed and set up as required for the particular configuration, you should not need to alter any of the settings for the modem.

NOTE   Factory-default settings for the modem are provided on .

System requirements for a 3112 data station

Software requirements for PC

The software requirement for the PC is Windows® 2000 or XP.

Firmware requirements for transceiver

The firmware requirement for a Codan HF transceiver is V4.59 or later.

Hardware requirements for PC

The hardware requirements for the PC are those required to support Windows® 2000 or XP, or those stated for the SeaLevel 5103 synchronous card, if used. This synchronous card is available from Codan (Codan part number 78-16042).

Hardware requirements for NGT series Transceiver

The hardware requirements for an NGT series Transceiver are:

Description	Codan part number
High-speed data	15-10541-000
Fan	15-10469-000
2.7 kHz filter	15-00514-000

NOTE	If you are upgrading an existing NGT Transceiver for operation with a 3112 HF Data Modem, you should confirm that is has: • RF/IF PCB 07-01961-07 (or later), *and* • Filter & Control PCB 07-01967-05 (or later)

NOTE	NGT *AR*, *SR* and *ASR* Transceivers with build standard Z and NGT *SRx* Transceivers with build standard E have hardware that is compatible for operation with the 3112 HF Data Modem. The build standard is indicated by the fifth digit from the right in the serial number.

Hardware requirements for 2110 Manpack Transceiver

The hardware requirements for a 2110 Manpack Transceiver are:

Description	Codan part number
2.7 kHz filter	15-10529-000

NOTE	If you are upgrading an existing 2110 Manpack Transceiver for operation with a 3112 HF Data Modem, you should confirm that is has RF/IF PCB 07-02012-04 (or later).
NOTE	Contact your Codan representative for the build standard that reflects compatible hardware in the 2110 Manpack Transceiver.

External DC power supply

The 3112 HF Data Modem may be operated using an external DC power supply if the correct power is not supplied from the third-party transceiver. The power supply must operate between 10 and 15 V DC.

Installing the 3112 HF Data Modem

The 3112 HF Data Modem is connected from the **Transceiver** connector on the modem to the 15-way or 19-way connector on the Codan HF transceiver (see page 21, *Connecting the modem to the transceiver*).

The 3112 HF Data Modem may be connected to a PC in one of three different configurations:

- via Ethernet ports (see page 22, *Connecting the modem to the PC via the Ethernet ports*)

- via an asynchronous port (see page 31, *Connecting the modem to the PC via an asynchronous port*)

- via a synchronous port (see page 38, *Connecting the modem to the PC via a synchronous port*)

NOTE   Use USB-to-serial-port cables to create COM ports if your PC only has USB ports. This cable may be ordered from Codan (Codan part number 78-01031).

The connection diagrams in this guide show the 3112 HF Data Modem connected to an NGT series Transceiver. If you are using a 2110 Manpack Transceiver, you can connect the modem directly to the 19-way connector on the front panel of the transceiver, or via the 15-way connector on the Interface Adaptor.

The following process should be followed during installation:

- install and set up the Codan HF transceiver, antenna and power supply (see the documentation provided with the transceiver)

- connect the transceiver to the modem

- connect the modem to the PC

- test the installation

- test the node-to-node communication

- install and set up the Codan STANAG 5066 Stack, if required

- install and set up HF Express™, if required

NOTE

By default, the backlighting for the LCD on the modem switches off 10 seconds after a button has been pressed. During initial setup, it may be useful to set the backlighting to **ON** (see Figure 13 on page 54 and page 57, *Accessing and changing a value*).

Connecting the modem to the transceiver

To connect the modem to the transceiver:

❑   Ensure the transceiver is switched off.

❑   Do one of the following:

  • connect cable 08-06356-00x between the
    Transceiver connector on the modem and the 15-way
    connector on the NGT series Transceiver or Interface
    Adaptor (2110 only)

  • connect cable 08-06786-00x between the
    Transceiver connector on the modem and the 19-way
    connector on the front panel of the 2110 Manpack
    Transceiver

NOTE	You should only use the cables provided with the 3112 HF Data Modem to ensure optimal performance.

❑   Switch on the transceiver.

❑   Access the Control List in the transceiver.

❑   Do one of the following:

  • In the NGT series Transceiver, set the RS232 15way
    Mode entry to **Modem Hold AGC**, and the RS232
    15way Speed entry to **9600**.

  • In the 2110 Manpack Transceiver, set the RS232 Mode
    entry to **Modem Slow AGC**, and the RS232 Speed
    entry to **9600**.

❑   Switch off the transceiver.

Connecting the modem to the PC via the Ethernet ports

The Ethernet connection between the modem and the PC can be made in two ways:

- directly, using a crossover CAT5 Ethernet cable (see Figure 5 on page 23)

- indirectly, via an Ethernet switch, using a straight CAT5 Ethernet cable (see Figure 6 on page 28)

NOTE   A ferrite bead (Codan part number 39-79150-080) must be attached to the Ethernet cable as close as possible to the **Ethernet** connector on the modem.

Connecting the modem directly to the PC using a crossover CAT5 Ethernet cable

This type of connection requires you to:

- connect the modem to the PC

- disable DHCP in the modem

- enter an IP address and subnet mask for the modem

- enter an IP address and subnet mask for the PC

- check the asynchronous Speed Mode setting in the modem

Figure 5:   Connecting the modem directly to the PC via the Ethernet ports
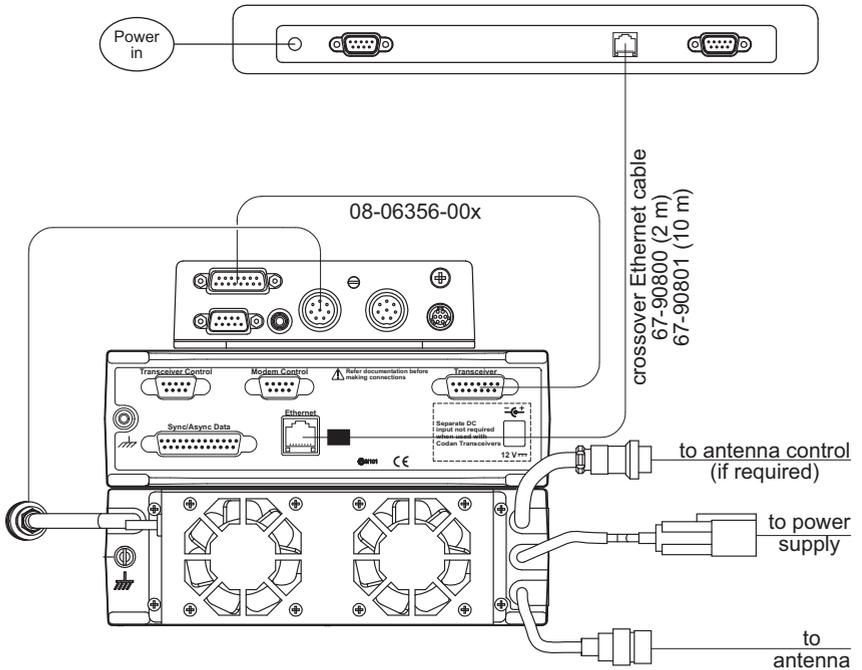
NOTE
Cable 08-06786-00x is used to connect the modem
to the 19-way connector on a 2110 Manpack Transceiver

NOTE
For information on connecting the modem to the transceiver see page 21, *Connecting the modem to the transceiver*.

Connecting the modem directly to the PC

To connect the modem to the PC:

❑   Connect a crossover CAT5 Ethernet cable between the **Ethernet** connector on the modem and the Ethernet connector on the PC.

> NOTE
>
> The following crossover CAT5 Ethernet cables are available from Codan:
> • 2 m cable (67-90800)
> • 10 m cable (67-90801)

❑   Attach the ferrite bead (Codan part number 39-79150-080) to the Ethernet cable as close as possible to the **Ethernet** connector on the modem.

❑   Switch on the PC and the transceiver, then wait until the modem has initialised.

Disabling DHCP in the modem

NOTE   DHCP is disabled by default.

To disable DHCP:

❑   On the front panel of the modem, press **MENU**.

❑   Press ⊽ repeatedly to scroll down through the menu options until **Remote Control** is highlighted.

❑   Press ▷ to enter the menu, press ▷ to enter the **DHCP** setting, then use ⊽ to set DHCP to **OFF**.

❑   Press ↵ to save the setting.

Setting an IP address and subnet mask in the modem

NOTE

The non-internet default IP address for the modem is 192.168.3.112.

The default subnet mask for the modem is 255.255.255.0.

To enter an IP address:

❑ On the front panel of the modem, press **MENU**.

❑ Press ⊽ repeatedly to scroll down through the menu options until **Remote Control** is highlighted.

❑ Press ▷ to enter the menu.

❑ Press ⊽ to scroll down through the menu options until **IP Address** is highlighted.

❑ Press ▷ to enter the setting, press ▷ to scroll across the value, and use △ and ⊽ to alter each highlighted value as required.

❑ Press ⏎ to save the IP address.

❑ Press ⊽ to scroll down through the menu options until **Subnet Mask** is highlighted.

❑ Press ▷ to enter the setting, press ▷ to scroll across the value, and use △ and ⊽ to alter each highlighted value as required.

❑ Press ⏎ to save the subnet mask.

❑ Save the profile (see page 63, *Saving a user profile*).

❑ Reset the modem by pressing ◁, MENU and ⏎ simultaneously.

Setting an IP address and subnet mask in the PC

NOTE

The options that you see depend upon the version of Microsoft Windows® that you have installed (Windows® XP is described below). For more information on this topic see the on-line help provided for Windows®.

To set up the PC for operation with the modem:

❑ In Windows, from the **Start** menu, select **Control Panel**—**Network Connections**.

❑ Double-click on **Local Area Connection**.

❑ Select the network that you want to use from the list.

❑ Click on **Properties**.

❑ Scroll through the listed components used by this connection, select **Internet Protocol (TCP/IP)**, then click on **Properties**.

❑ Select **Use the following IP address**, then enter an IP address that uses the same subnet as the modem, for example, 192.168.3.1.

❑ Enter an appropriate subnet mask, for example, 255.255.255.0.

❑ Click on **OK**.

Checking the asynchronous settings in the modem

To check the asynchronous settings:

❑   On the front panel of the modem, press **MENU**.

❑   Press ⊗ repeatedly to scroll down through the menu
      options until **Async Settings** is highlighted.

❑   Press ▷ to enter the menu, press ▷ to enter the **Speed
      Mode** setting, then use ⊗ to set the mode to
      HIGHSPEED.

❑   Press ⏎ to save the setting.

❑   Save the profile (see page 63, *Saving a user profile*).

Connecting the modem indirectly to the PC (via an Ethernet switch) using a straight CAT5 Ethernet cable

This type of connection requires you to:

•   connect the modem to the PC via an Ethernet switch

•   enable DHCP in the modem

•   set up the PC to automatically obtain an IP address

•   check the asynchronous Speed Mode setting in the
      modem

Figure 6:   Connecting the modem indirectly to the PC via an Ethernet switch with DHCP server
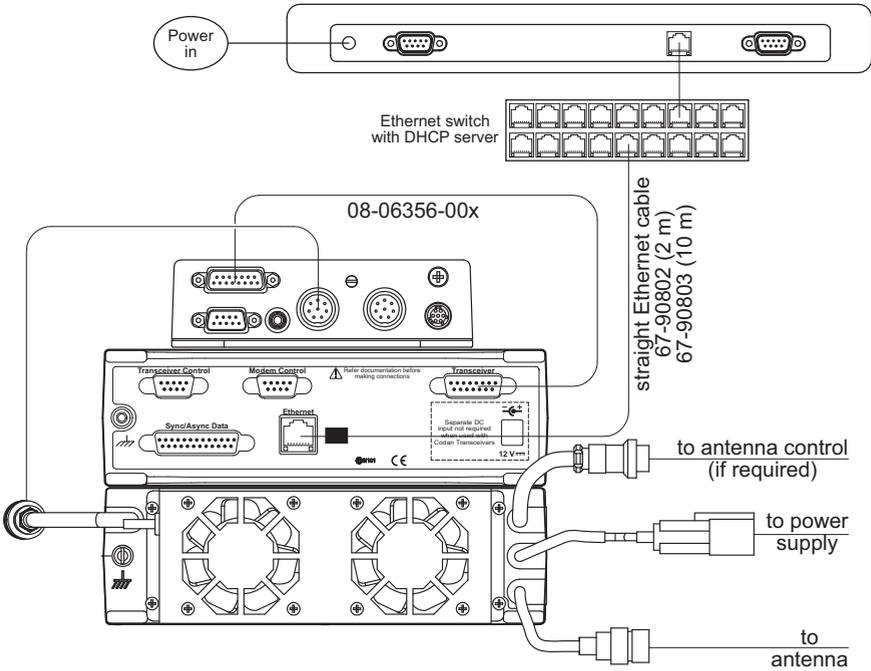
NOTE
Cable 08-06786-00x is used to connect the modem
to the 19-way connector on a 2110 Manpack Transceiver

NOTE

For information on connecting the modem to the transceiver see page 21, *Connecting the modem to the transceiver*.

Connecting the modem indirectly to the PC via an Ethernet switch

To connect the modem to the PC via an Ethernet switch:

❑ Connect a straight CAT5 Ethernet cable between the **Ethernet** connector on the modem and an Ethernet network point.

❑ Connect a straight CAT5 Ethernet cable between the Ethernet port on a PC and an Ethernet network point.

NOTE	The following straight CAT5 Ethernet cables are available from Codan: • 2 m cable (67-90802) • 10 m cable (67-90803)

❑ Attach the ferrite bead (Codan part number 39-79150-080) to the Ethernet cable as close as possible to the **Ethernet** connector on the modem.

❑ Switch on the PC and the transceiver, then wait until the modem has initialised.

Enabling DHCP in the modem

NOTE   DHCP is disabled by default.

To enable DHCP:

❑ On the front panel of the modem, press **MENU**.

❑ Press ⊽ repeatedly to scroll down through the menu options until **Remote Control** is highlighted.

❑ Press ▷ to enter the menu, press ▷ to enter the **DHCP** setting, then use ⊽ to set DHCP to **ON**.

❑ Press ⏎ to save the setting.

❑ Save the profile (see page 63, *Saving a user profile*).

❑ Reset the modem by pressing ◁, ⌨ and ⏎ simultaneously.

Setting up the PC to automatically obtain an IP address

NOTE

The options that you see depend upon the version of Microsoft Windows® that you have installed (Windows® XP is described below). For more information on this topic see the on-line help provided for Windows®.

To set up the PC for operation with the modem:

❑ In Windows, from the **Start** menu, select **Control Panel**—**Network Connections**.

❑ Double-click on **Local Area Connection**.

❑ Select the network that you want to use from the list.

❑ Click on **Properties**.

❑ Scroll through the listed components used by this connection, select **Internet Protocol (TCP/IP)**, then click on **Properties**.

❑ Select **Obtain an IP address automatically**.

❑ Click on **OK**.

Checking the asynchronous settings in the modem

To check the asynchronous settings:

❑ On the front panel of the modem, press **MENU**.

❑ Press ⑦ repeatedly to scroll down through the menu options until **Async Settings** is highlighted.

❑ Press ⑧ to enter the menu, press ⑧ to enter the **Speed Mode** setting, then use ⑦ to set the mode to **HIGHSPEED**.

❑ Press ⓙ to save the setting.

❑ Save the profile (see page 63, *Saving a user profile*).

Connecting the modem to the PC via an asynchronous port

This type of connection requires you to:

- connect the modem to the PC

- set up the modem for asynchronous operation

- define the COM ports

Figure 7 shows the connections required between the modem and the PC when they are connected via an asynchronous port. Permanent connections between the **Transceiver Control** and **Modem Control** connectors on the modem to the PC are only required for control of these units when the Codan STANAG 5066 Stack is installed in the PC.

Figure 7:   Connecting the modem to the PC via an asynchronous port
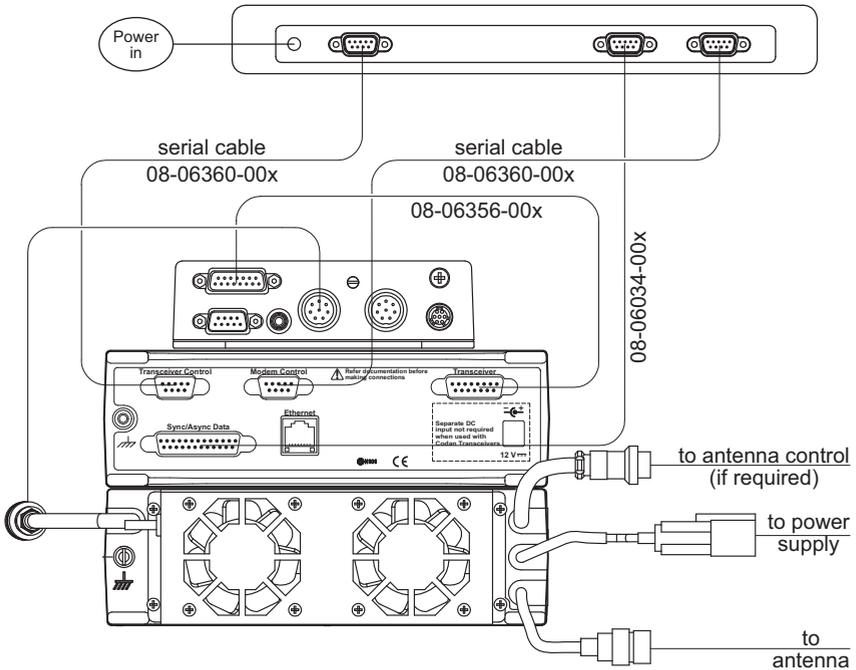
NOTE
Cable 08-06786-00x is used to connect the modem
to the 19-way connector on a 2110 Manpack Transceiver

NOTE   For information on connecting the modem to the transceiver see page 21, *Connecting the modem to the transceiver*.

Connecting the modem to the PC

To connect the modem to the PC:

❑ Connect the **Sync/Async Data** connector on the modem to a COM port on the PC using the 25-way to 9-way cable (Codan part number 08-06034-00x).

❑ If you want to control the transceiver via the Codan STANAG 5066 Stack or a terminal session, connect the **Transceiver Control** connector on the modem to a COM port on the PC using a 9-way to 9-way serial cable (Codan part number 08-06360-00x).

❑ If you want to control the modem via the Codan STANAG 5066 Stack or a terminal session, connect the **Modem Control** connector on the modem to a COM port on the PC using a 9-way to 9-way serial cable (Codan part number 08-06360-00x).

Setting up the modem for asynchronous operation

To set up the modem to operate asynchronously:

❑ On the front panel of the modem, press **MENU**.

❑ Press ⟟ repeatedly to scroll down through the menu options until **Data Port Mode** is highlighted.

❑ Press ⟟ to enter the setting, then use ⟟ to set the Data Port Mode to **ASYNC**.

❑ Press ⟟ to save the setting.

❑ Press ⟟ repeatedly to scroll down through the menu options until **Async Settings** is highlighted.

❑ Press ▷ to enter the menu, then use ▽ to set any of the following settings as required, then press ⏎.

Async Setting	Description
Speed Mode	Sets whether the data transmission is: • **NORMAL** (with start/stop framing; recommended for loopmode testing of the modem) • **HIGHSPEED** (without start/stop framing; recommended for normal operation)
Data Bits	Sets the number of data bits per character for the interface Data bits may be set in the range 5–8, typically 8 The value set here should match the value set for the COM port on the PC
Parity	Sets whether odd, even or no parity is used The value set here should match the value set for the COM port on the PC
Stop Bits	Sets whether 1 or 2 stop bits are transmitted at the end of each character The value set here should match the value set for the COM port on the PC

Async Setting	Description
Data Flow Ctrl	Sets whether the flow control is: • **NONE** • **CTS** (hardware) The value set here should match the value set for the COM port on the PC
Data Rate	Sets the data interface baud rate in bits per second from common baud rates in the range 75 to 115200 bps The value set here should be at least twice the maximum transmit and receive data rates in the modem, for example, set this to 19200 bps to use 9600 bps on air
Polarity	Sets whether the polarity is: • **NORMAL** (space is positive, mark is negative) • **INVERTED** (space is negative, mark is positive)
RTS Mode	Sets whether RTS signal transitions are: • **IGNORED** (modem transmitter is activated when data is provided from DTE) • **TXCTRL** (RTS signal controls the modem transmitter)

❑ If you have made any changes from the default profile, save the profile (see page 63, *Saving a user profile*).

Defining the COM ports

To define the COM ports:

❑ Open three terminal-emulation sessions.

❑ Assign a terminal-emulation session to each of the COM ports used by the modem. Use the following communication settings to determine which COM port on the PC is used by which connector on the modem.

Connector on modem	COM port settings	Typical command/response
Transceiver Control	Data rate: 9600 bps Data bits: 8 Parity: Even Stop bits: 1 Flow control: None	Command: `ver` Response: `CICS: V3.20`
Modem Control	Data rate: 9600 bps Data bits: 8 Parity: Even Stop bits: 1 Flow control: None	Command: `report?` Response: `REPORT = OFF` `OK`
Async Data	Data rate: at least twice the maximum transmit and receive data rates set in the modem Data bits: same as modem Parity: same as modem Stop bits: same as modem Flow control: same as modem	See page 47, *Testing communication between two nodes*

❑ Name each terminal-emulation session with an appropriate name that reflects its use, then save the session.

NOTE If you are using a Windows® XP operating system, confirm that your settings are correct before saving the session.

NOTE

If you intend to use the Codan STANAG 5066 Stack, you must record which COM port is assigned to each port on the modem, as this information must be entered during installation of the stack.

Connecting the modem to the PC via a synchronous port

This type of connection requires you to:

- connect the modem to the PC

- set up the modem for synchronous operation

- define the COM ports

- set up the synchronous card for operation with the modem

Figure 8 shows the connection required between the modem and the PC when they are connected via a synchronous port. Permanent connections between the **Transceiver Control** and **Modem Control** connectors on the modem to the PC are only required for control of these units when the Codan STANAG 5066 Stack is installed in the PC.

Figure 8:   Connecting the modem to the PC via a synchronous port
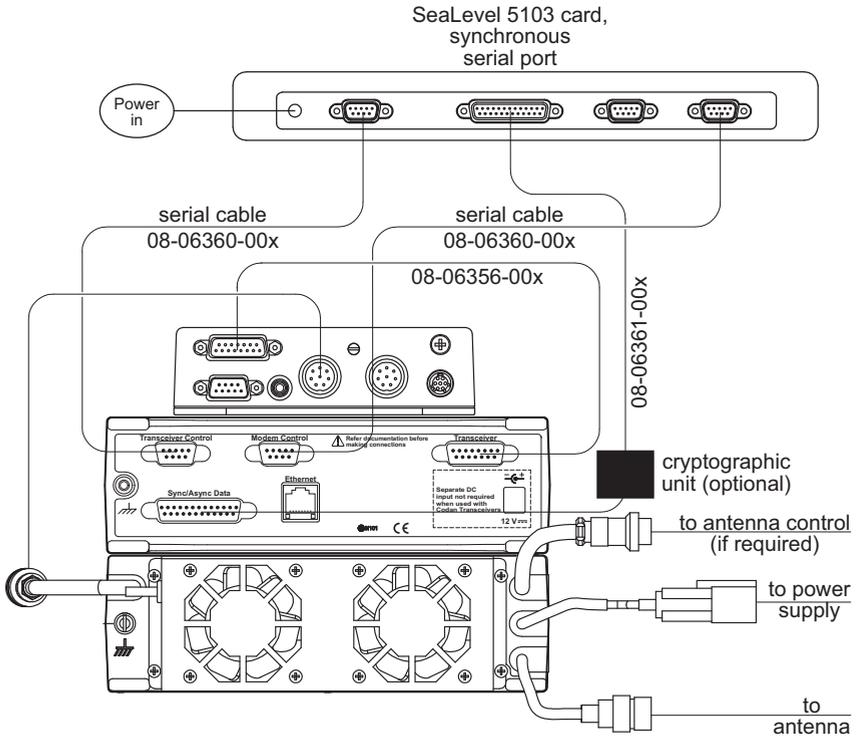
NOTE
Cable 08-06786-00x is used to connect the modem
to the 19-way connector on a 2110 Manpack Transceiver

NOTE   For information on connecting the modem to the transceiver see page 21, *Connecting the modem to the transceiver*.

Connecting the modem to the PC

To connect the modem to the PC:

❑   Connect the **Sync/Async Data** connector on the
      modem to the synchronous port on the PC using the
      25-way to 25-way cable (Codan part number
      08-06361-00x).

❑   If you want to control the transceiver via the Codan
      STANAG 5066 Stack or a terminal session, connect the
      Transceiver Control connector on the modem to a
      COM port on the PC using a 9-way to 9-way serial cable
      (Codan part number 08-06360-00x).

❑   If you want to control the modem via the Codan
      STANAG 5066 Stack or a terminal session, connect the
      Modem Control connector on the modem to a COM
      port on the PC using a 9-way to 9-way serial cable
      (Codan part number 08-06360-00x).

Setting up the modem for synchronous operation

To set up the modem to operate synchronously:

❑   On the front panel of the modem, press **MENU**.

❑   Press ⊽ repeatedly to scroll down through the menu
      options until **Data Port Mode** is highlighted.

❑   Press ▷ to enter the setting, then use ⊽ to set the Data
      Port Mode to **SYNC**.

❑   Press ⏎ to save the setting.

❑   Press ⊽ repeatedly to scroll down through the menu
      options until **Sync Settings** is highlighted.

❑ Press ▷ to enter the menu, then use ▽ to set any of the following settings as required, then press ⏎.

Sync Setting	Description
Tx Clock	Sets whether the source for the Tx Clock comes from: • **INPUT** (the modem synchronises with the clock generated by the DTE) • **OUTPUT** (the DTE synchronises with the clock generated by the modem)
Polarity	Sets whether the polarity is: • **NORMAL** (space is positive, mark is negative) • **INVERTED** (space is negative, mark is positive)

❑ If you have made any changes from the default profile, save the profile (see page 63, *Saving a user profile*).

Defining the COM ports

To define the COM ports:

❑   Open two terminal-emulation sessions.

❑   Assign a terminal-emulation session to each of the COM
ports used by the modem. Use the following
communication settings to determine which COM port
on the PC is used by which connector on the modem.

Connector	COM port settings	Typical command/response
Transceiver Control	Data rate: 9600 bps Data bits: 8 Parity: Even Stop bits: 1 Flow control: None	Command: `ver` Response: `CICS: V3.20`
Modem Control	Data rate: 9600 bps Data bits: 8 Parity: Even Stop bits: 1 Flow control: None	Command: `report?` Response: `REPORT = OFF` `OK`

❑   Name each terminal-emulation session with an
appropriate name that reflects its use, then save the
session.

NOTE	If you are using a Windows® XP operating system, confirm that your settings are correct before saving the session.
NOTE	If you are using the Codan STANAG 5066 Stack, you must record which COM port is assigned to each port on the modem, as this information must be entered during installation of the stack.

Setting up the synchronous card for operation with the modem

The installation CD provided with the synchronous card automatically sets up the card for operation with the modem.

Testing the installation

NOTE   If you are testing an Ethernet installation, you need to know the IP address of the modem in order to test the installation. See for the location of the IP address setting in the menu structure.

NOTE   The terminal-emulation sessions using COM ports described below were defined during installation (see or).

To test that the modem and PC are communicating:

❑   Switch on the PC and the transceiver, then wait until the modem has initialised.

❑   Do one of the following:

•   For an Ethernet installation, start a terminal-emulation session using a TCP/IP connection for each of the following:

Port	Enter...
Data	Host address: <IP address of modem>, for example, 192.168.3.112
	Port number: <base port of modem>, for example, 50000
Modem control	Host address: <IP address of modem>, for example, 192.168.3.112
	Port number: <base port of modem + 2>, for example, 50002

NOTE   The host address listed above is the default IP address for the modem. The port number listed above is the default base port of the modem.

• For an asynchronous COM port installation, start the following terminal sessions:

Connector	Terminal
Sync/Async Data	Any terminal-emulation program
Modem Control	Any terminal-emulation program

• For a synchronous port installation, start the following terminal sessions:

Connector	Terminal
Sync/Async Data	WinSSD
Modem Control	Any terminal-emulation program

NOTE   Save any new setup for a terminal session with an appropriate name that reflects its use.

❑   In the modem control session, type:

report off
tcvr duplex full
loopmode audio
async mode normal

❑   If you are testing a synchronous port installation, use the terminal software supplied with the synchronous card (WinSSD) to set up the synchronous port to match the synchronous settings in your modem.

NOTE   If the synchronous setting in the modem for Tx Clock is set to **INPUT** (that is, the clock is supplied by the modem), the selected clock bit rate for the synchronous card must match the currently selected transmit data rate of the modem.

❑ In the data session, type some test text.

The text that you type is passed via the modem and appears in the terminal session.

The LCD on the modem shows that the modem is transmitting and receiving simultaneously. For example:

```
           LOC
TX 4539   300   S
RX 4539   300   S
PTT     SNR 14 dB
```

❑ Reset the modem by pressing ◁, ⊛ and ⏎ simultaneously.

The modem is installed correctly.

Testing communication between two nodes

NOTE

The modem must be set to half duplex and no loopmode. These can be set via the front panel of the modem (see page 55, *Using the navigation buttons* and Figure 13 on page 54) or via a terminal-emulation session on the modem control port using **tcvr duplex half** and **loopmode none** commands.

To test communication between two nodes:

❑ Ensure that the transceiver and modem at each node are switched on, that the modems are using a common waveform, and that the transceivers are set to a common channel.

❑ Do one of the following:

• If your modem and PC are connected via the Ethernet ports, open the terminal-emulation session on the data port (for help see page 44, *Testing the installation*).

• If your modem and PC are connected via an asynchronous COM port, open the terminal-emulation session on the COM port connected to the **Sync/Async Data** connector (for help see page 44, *Testing the installation*).

• If your modem and PC are connected via a synchronous port, open the WinSSD terminal session on the synchronous port.

❑ In the terminal-emulation/WinSSD session for the data port, type some text.

This text appears in the terminal-emulation/WinSSD session for the data port at the remote node.

The LCD on the modem at the *local* node indicates that the modem is under remote control and is transmitting.

```
            REM
TX 4539  300   S
RX 4539  AUTO
PTT
```

The LCD on the modem at the *remote* node indicates that the modem is under remote control and is receiving.

```
            REM
TX 4539  300   S
RX 4539  300   S
         SNR 10 dB
```

The modems transmit and receive.

❑   Repeat this test from the other node.

3   Operating the modem

This section contains the following topics:

General

When the 3112 HF Data Modem is used with the Codan STANAG 5066 Stack, the modem and transceiver operate automatically under the control of the stack. The stack selects the most suitable waveform and appropriate settings for the HF data communication.

When the modem is used without the Codan STANAG 5066 Stack, the transceiver and modem must be operated manually. The HF link must be established via the handset or front panel of the Codan HF transceiver. You must select an appropriate waveform and settings for the HF data communication (see page 59, *Selecting a waveform*).

Screens

Depending on the current operation of the modem, any one of the following screens may be active.

The status screen

The status screen is shown when the modem is idle. If a button on the front panel of the modem has not been pressed for over 30 seconds, the modem returns to the status screen. The modem is under local control, indicated by **LOC** at the top right of the screen. While the modem is under local control, you can enter the menu structure and make changes to the setup of the modem.

Figure 9:   Layout of the status screen

transmit information — TX 4539 300 S — location of current control
receive information — RX 4539 AUTO

selected waveform   data rate   interleaver length
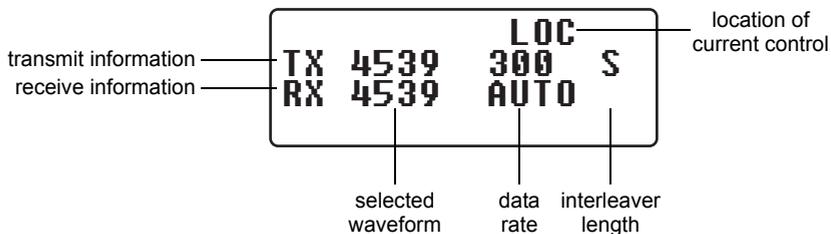
The menu screen

The menu screen is shown when the **MENU** button is pressed.
It comprises a heading row, followed by a scrolling list of
menu options. A menu option may contain further menu
options, or values that may be changed. For more information
on navigating through the menu structure see page 55, *Using
the navigation buttons*.

Figure 10:   Layout of a menu screen

menu name
active line
next menu options
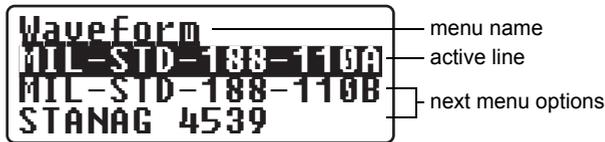
The transmitting screen

The transmitting screen is shown when the modem transmits
data. **PTT** is shown at the bottom left of the screen during
transmission. If the modem is under remote control by the
Codan STANAG 5066 Stack, **REM** is displayed at the top
right of the screen.

CAUTION   You can view, but not change, items in the menu
structure while the modem is under remote
control by the Codan STANAG 5066 Stack.

Figure 11:   Screen during data transmission
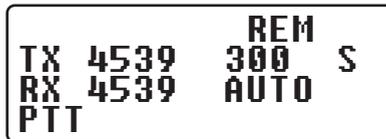
The receiving screen

The receiving screen is shown when the modem receives data. **SNR xx dB** is shown at the bottom right of the screen during reception. If the modem is under remote control by the Codan STANAG 5066 Stack, **REM** is displayed at the top right of the screen. The receive information includes the detected data rate and interleaver length of the incoming transmission. An SNR of −10 dB indicates poor link quality. An SNR of 30 dB indicates excellent link quality.

CAUTION   You can view, but not change, items in the menu structure while the modem is under remote control by the Codan STANAG 5066 Stack.

Figure 12:   Screen during data reception

```
                 REM
 TX  4539   300    S
 RX  4539   300    S
           SNR 10 dB
```

Menu structure

NOTE   For details of each waveform see page 67, *Menu structures for waveforms*.

Figure 13:   Top-level menu structure for the modem

Waveform	MIL-STD-188-110A	See Figure 14 on page 68
	MIL-STD-188-110B	See Figure 15 on page 69
	STANAG 4539	See Figure 17 on page 71
	STANAG 4415	See Figure 18 on page 73
	39Tone	See Figure 16 on page 70
Transceiver	ALC Setup Time	
	Audio Level	
	PTT Hang Time	
	PTT Control	
	Duplex Mode	
Sync Settings	Tx Clock	
	Polarity	
Async Settings	Speed Mode	
	Data Bits	
	Parity	
	Stop Bits	
	Data Flow Ctrl	
	Data Rate	
	Polarity	
	RTS Mode	
Test	Loop Mode	
	Tx Data Source	
Remote Control	DHCP	
	IP Address	
	Subnet Mask	
	Gateway Address	
	Base Port	
	MAC Address	
User Settings	Save Profile	
	Load Profile	
	LCD Contrast	
	Backlight	
Data Port Mode	SYNC	
	ASYNC	

Using the navigation buttons

The navigation buttons

There are six navigation buttons on the front of the
3112 HF Data Modem.

Table 1:   Navigation buttons and their function

Button	Function
(MENU)	One of the following: • enters the menu structure, or • if within the menu structure, cancels the current operation and exits to the top level of the menu, or • if at the top level of the menu, shows the status screen
⏎	Saves the currently selected value and exits to the previous menu level
△	One of the following: • scrolls up through the menu options, or • scrolls up through the list of values available for the selected menu option or digit
▽	One of the following: • scrolls down through the menu options, or • scrolls down through the list of values available for the selected menu option or digit
◁	One of the following: • moves out of a submenu to the previous level without saving the current value, or • scrolls to the previous digit
▷	One of the following: • moves from a menu option into a submenu, or • moves from a menu option to the list of values available for the selected menu option, or • scrolls to the next digit

Accessing and changing a value

To access and change a value in the menu structure:

❑ Press **MENU**.

❑ Use ⊚ and ⊚ to scroll through the menu options.

❑ Press ⊚ to enter the menu option.

If there are more menu options, use ⊚ and ⊚ to scroll through the menu options, then ⊚ to enter the menu option.

❑ Use ⊚ and ⊚ to change the value.

If the value comprises a set of digits that may be changed individually, press ⊚ to scroll across the digits, and use ⊚ and ⊚ to alter each highlighted digit as required.

❑ Press ⊚ to save the new value.

If you do not want to save the new value, press ⊚ to exit back to the menu option.

NOTE	If you do not press a button on the front panel for 30 seconds, the modem exits the menu structure and returns to the status screen without saving data.

❑ If you have made any changes that you want to keep, save the profile (see page 63, *Saving a user profile*).

Operating the modem using controlling software

When the modem is connected to the PC via the Ethernet port, or via three COM ports (3 asynchronous, or 2 asynchronous + 1 synchronous), you can communicate between nodes using the Codan STANAG 5066 Stack.

The Codan STANAG 5066 Stack Control interface enables you to set up the stack so that it controls the operation of the modem and the transceiver. For information on how to use the STANAG 5066 Stack Control interface see the on-line help provided with the program.

Codan's HF Express™ is a software program that enables simple chat and file transfer between nodes in an HF data communication network. It must be used in conjunction with Codan's STANAG 5066 Stack. For information on how to use HF Express see the on-line help provided with the program.

| NOTE | If the transceiver and modem are directed to make a call to a STANAG address for which there is no ALE address information pre-defined in the STANAG 5066 Stack, the stack proceeds with the data transfer regardless of the state of the transceiver. Therefore, you must set the transceivers at the sending and receiving nodes to the same channel prior to transferring data under these conditions. |

Selecting a waveform

NOTE

If the modem is under the control of the Codan STANAG 5066 Stack during communication, all waveform settings are determined by the stack.

If you are not using the modem with the Codan STANAG 5066 Stack, you must select an appropriate waveform for the data communication. You must also check the settings associated with the waveform. For more information on these settings see page 67, *Menu structures for waveforms* and page 60, *Guidelines for manually selecting a waveform*.

The STANAG 4539 waveform incorporates MIL-STD-188-110A and MIL-STD-188-110B waveforms. Some Tx interleaver values are not applicable for 110A and 110B, depending on the transmit rate (see Table 4 on page 61).

NOTE

Although the values appear in the STANAG 4539 menu structure, they cannot be selected. The modem selects the next higher Tx interleaver value.

To select a waveform:

❑ On the front panel of the modem, press **MENU**.

❑ Press ▷ to enter the **Waveform** menu, then use △ and ▽ to scroll to the waveform that you want to use (see page 60, *Guidelines for manually selecting a waveform*).

❑ Press ▷ to enter the menu.

If the waveform is not currently in use, **Enable waveform** is highlighted.

❑ Press ↵ to select the waveform.

❑ Use Ⓐ and Ⓥ to highlight any of the settings for the waveform, press Ⓓ to enter the setting, change the value as required, then press Ⓙ.

❑ If you have made any changes from the default profile, save the profile (see page 63, *Saving a user profile*).

Guidelines for manually selecting a waveform

The waveforms from which you may choose are listed in Table 2.

Table 2: Available waveforms

Waveform	Data rate	Comments
4539	75 to 9600 bps	Recommended
110A	75 to 2400 bps	Used as required for interoperability with other equipment
110B (serial)	3200 to 9600 bps	
4415	75 bps	
39Tone	75 to 2400 bps	

The data rate that you select for the waveform depends on the quality of the HF channel. Table 3 lists typical data rates for the reported SNR and channel quality.

Table 3:   Typical data rates, SNR and channel quality

Typical SNR	Channel quality	Data rate	Comments
–10 to +5 dB	Poor	75 to 600 bps	Voice communications are not usually possible
+5 to +15 dB	Average	1 200 to 3 200 bps	Voice communications are possible
+15 to +30 dB	Excellent	4 800 to 9 600 bps	Very clear, uninterrupted voice communications are possible

NOTE   The SNR figure may vary, depending on the type of noise (single tone/broadband), fading conditions and multi-path.

Table 4:   Waveform, data rate and interleaver relationships

Waveform	Data rate (bps)	Applicable interleaver values
MIL-STD-188-110A MIL-STD-188-110B (serial)	75 150 300 600 1 200 2 400	ZERO SHORT LONG
	4 800 uncoded	ZERO

Table 4:   Waveform, data rate and interleaver relationships (cont.)

Waveform	Data rate (bps)	Applicable interleaver values
MIL-STD-188-110A MIL-STD-188-110B (39Tone)	75 150 300 600 1200	ZERO SHORT MEDIUM LONG
	2400	ZERO ULTRA_SHORT VERY_SHORT SHORT MEDIUM LONG VERY_LONG DOUBLE_LONG
STANAG 4539	75 150 300 600 1200 2400	ZERO SHORT LONG
	4800 uncoded	ZERO
	3200 4800 6400 8000 9600	ULTRA_SHORT VERY_SHORT SHORT MEDIUM LONG VERY_LONG
	12800 uncoded	ULTRA_SHORT

Saving a user profile

If you have made changes to the setup of the modem from the default values, you can save this new setup as a profile. If you use your modem in a number of different situations, you can save the setup for each situation as a profile that can be reloaded at the time of use (see page 64, *Loading a profile*). You can save up to 20 profiles.

To save a user profile:

❑ On the front panel of the modem, press **MENU**.

❑ Press Ⓥ repeatedly to scroll down through the menu options until **User Settings** is highlighted.

❑ Press Ⓓ to enter the menu, press Ⓓ to enter the **Save Profile** setting, then use Ⓐ and Ⓥ to select the value of the profile name.

❑ Press Ⓙ to save the setting.

Loading a profile

You may have set up your modem for use in different situations, then saved each setup as a user profile. You can re-load a saved user profile. The profile can be changed during use, but these changes are only kept if you save the profile (see page 63, *Saving a user profile*). Only one profile may be active at a time. In special cases, you may want to re-load the factory-default profile to return to a known operating setup (see page 65, *Resetting to factory defaults*). For information on default settings see page 85, *Factory-default settings*.

To load a profile:

❑ On the front panel of the modem, press **MENU**.

❑ Press ⊘ repeatedly to scroll down through the menu options until **User Settings** is highlighted.

❑ Press ▷ to enter the menu, press ⊘ to scroll down to **Load Profile**, press ▷ to enter the **Load Profile** setting, then use ⊘ and ⊘ to select the value of the profile name.

❑ Press ⏎ to save the setting.

❑ Reset the modem by pressing ◁, ⊞ and ⏎ simultaneously.

Resetting to factory defaults

During setup or daily operation, you may come to a point when you need to return to a known operating state. In this situation, you can re-load the factory-default profile.

NOTE A list of factory-default settings is provided on page 85, *Factory-default settings*.

To load the factory-default profile:

❑ On the front panel of the modem, press **MENU**.

❑ Press ▽ repeatedly to scroll down through the menu options until **User Settings** is highlighted.

❑ Press ▷ to enter the menu, press ▽ to scroll down to **Load Profile**, press ▷ to enter the **Load Profile** setting, then use △ and ▽ to select **FACTORY**.

❑ Press ⏎ to load the factory-default profile.

❑ Reset the modem by pressing ◁, ⒨ and ⏎ simultaneously.

Using the on-board help in the modem

The modem has an on-board help that lists all the remote control protocol commands that you can use to control the modem. You can access the help using a terminal-emulation session.

To access the on-board help:

❑ Open one of the following terminal-emulation sessions:

- the COM port connected to the **Modem Control** connector on the modem

- the data port on the **Ethernet** connector on the modem

NOTE	For help see page 44, *Testing the installation*.

❑ In the modem control session, type:

report off
help

A list of the help categories is provided.

❑ To access a help category type **help** <**category name**>, for example, **help modem**.

Appendix A—Menu structures for waveforms

This section contains the following topics:

NOTE   The factory-default values are indicated for each waveform. Only these values are loaded when the factory profile is loaded.

MIL-STD-188-110A

NOTE   The Rx interleaver value is set by the demodulator from the received signal.

Figure 14:   Menu structure for MIL-STD-188-110A waveform

Tx Rate	75
	150
	300
	600
	1200
	2400 (default)
	4800UNCODED
Tx Interleaver	ZERO
	SHORT (default)
	LONG
Rx Int. Set	ZERO
	SHORT (default)

MIL-STD-188-110B

Serial tone

Figure 15:   Menu structure for MIL-STD-188-110B waveform (serial tone)

Tx Rate	3200
	4800
	6400
	8000
	9600 (default)
	12800UNCODED
Tx Interleaver	ULTRA_SHORT
	VERY_SHORT
	SHORT (default)
	MEDIUM
	LONG
	VERY_LONG
TLC Blocks	1–7, editable (default 7)
Optional EOM	OFF
	ON (default)
Rx Limit	0–65535, editable (default 32767, 0 = disabled)

39Tone

Figure 16:   Menu structure for MIL-STD-188-110B
waveform (39Tone)

Tx Rate	75
Rx Rate	150
	300
	600
	1200 (default)
	2400
Tx Interleaver	ZERO
Rx Interleaver	ULTRA_SHORT
	VERY_SHORT
	SHORT
	MEDIUM
	LONG (default)
	VERY_LONG
	DOUBLE_LONG
Tx Diversity	FREQ (default)
Rx Diversity	TIMEFREQ
Preamble Length	SHORT (default)
	LONG

STANAG 4539

NOTE	The Rx interleaver value is set by the demodulator from the received signal.

Figure 17:   Menu structure for STANAG 4539 waveform

Tx Rate	75
	150
	300
	600
	1200
	2400
	3200
	4800UNCODED
	4800
	6400
	8000
	9600 (default)
	12800UNCODED
Tx Interleaver	ZERO
	ULTRA_SHORT
	VERY_SHORT
	SHORT (default)
	MEDIUM
	LONG
	VERY_LONG
Rx Int. Set	ZERO
	SHORT (default)
TLC Blocks	1–7, editable (default 7)
Optional EOM	OFF
	ON (default)
Rx Limit	0–65535, editable (default 32767, 0 = disabled)

NOTE

The STANAG 4539 waveform incorporates MIL-STD-188-110A and MIL-STD-188-110B waveforms. Some Tx interleaver values are not applicable for 110A and 110B depending on the transmit rate (see Table 4 on page 61). Although the values appear in the STANAG 4539 menu structure, they cannot be selected. The modem selects the next higher Tx interleaver value.

STANAG 4415

Figure 18:   Menu structure for STANAG 4415 waveform

Tx Interleaver	ZERO
	SHORT (default)
	LONG
Rx Int. Set	ZERO
	SHORT (default)

This page has been left blank intentionally.

Appendix B—Connectors

This section contains the following topics:

Transceiver Control connector

The **Transceiver Control** connector is a 9-way, D-type male connector on the rear panel of the 3112. It provides an asynchronous, RS232, DTE, remote control interface to the transceiver. The port is fully optically isolated.

The port settings are fixed as follows:

Baud rate	9600
Data bits	8
Parity	Even
Stop bits	1
Flow control	None

Figure 19: Front view of the Transceiver Control connector
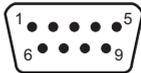
Table 5: Pinouts for the Transceiver Control connector

Pin No.	Function	Input/Output	Signal level
1	N/C		
2	Rx data	Input	RS232
3	Tx data	Output	RS232
4	N/C		
5	Signal ground		0 V
6–9	N/C		

Modem Control connector

The **Modem Control** connector is a 9-way, D-type male connector on the rear panel of the 3112. It provides an asynchronous, RS232, DTE, remote control interface to the modem. The port is fully optically isolated.

The port settings are fixed as follows:

Baud rate	9600
Data bits	8
Parity	Even
Stop bits	1
Flow control	None

Figure 20:   Front view of the Modem Control connector
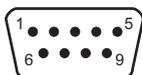
Table 6:   Pinouts for the Modem Control connector

Pin No.	Function	Input/Output	Signal level
1	N/C		
2	Rx data	Input	RS232
3	Tx data	Output	RS232
4	N/C		
5	Signal ground		0 V
6–9	N/C		

Transceiver connector

The **Transceiver** connector is a 15-way, D-type male connector on the rear panel of the 3112. It provides the power, data, and control connection between the modem and the Codan HF transceiver.

Figure 21: Front view of the Transceiver connector
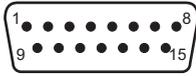
Table 7: Pinouts for the Transceiver connector

Pin No.	Function	Input/Output	Signal level
1	Positive supply	Input	+12 V nominal supply
2			
3	Rx data	Input	RS232
4	PTT return	Output	Opto-coupler emitter
5	Q line control line	Output	Open collector, 20 V maximum
6	600 Ω balanced, transformer isolated audio −	Output	−30 to +5 dBm audio, software adjustable
7	PTT to key transceiver	Output	Opto-coupler, open collector, 20 V maximum
8	600 Ω balanced, transformer isolated audio +	Output	−30 to +5 dBm audio, software adjustable
9	Power and signal ground		0 V
10			

Table 7:   Pinouts for the Transceiver connector (cont.)

Pin No.	Function	Input/Output	Signal level
11	Spare line	Input/Output	Input: VIL 0 to 0.8 V VIH 2.4 to 20 V Output: Open collector, 20 V maximum
12	Spare line	Input/Output	
13	600 Ω balanced, transformer isolated audio –	Input	–30 to +3 dBm, AGC controlled
14	Tx data	Output	RS232
15	600 Ω balanced, transformer isolated audio +	Input	–30 to +3 dBm, AGC controlled

Sync/Async Data connector

The **Sync/Async Data** connector is a 25-way, D-type female connector on the rear panel of the 3112. It provides a DCE interface. The port settings can be configured as required for your installation. This port is fully optically isolated.

In asynchronous mode, the connector passes data at rates up to 115 kbps. In synchronous mode, the connector passes data at rates up to 9600 bps.

Figure 22:   Front view of the Sync/Async Data connector
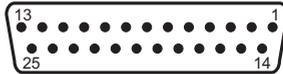
Table 8:   Pinouts for the Sync/Async Data connector

Pin No.	Function	Input/Output	Signal level
1	Frame ground		0 V
2	Tx data	Input	RS232
3	Rx data	Output	RS232
4	RTS	Input	RS232
5	CTS	Output	RS232
6	DSR	Output	RS232
7	Ground		0 V
8	DCD	Output	RS232
9–14	N/C		
15	Transmitter clock	Output	RS232
16	N/C		

Table 8:   Pinouts for the Sync/Async Data
connector (cont.)

Pin No.	Function	Input/Output	Signal level
17	Receiver clock	Output	RS232
18–19	N/C		
20	DTR	Input	RS232
21	N/C		
22	Ring indicator	Output	RS232
23	N/C		
24	External transmitter clock	Input	RS232
25	N/C		

Ethernet connector

The **Ethernet** connector provides a standard connection via a straight or crossover CAT5 Ethernet cable. The connector has two LEDs (see Figure 23).

The LAN activity LED flashes yellow when data is sent or received through the connector.

The link status LED is steady green when there is a good connection between the **Ethernet** connector and the supporting switch.

The Ethernet port supports both 10 and 100 Mbps operation.

Figure 23:　Front view of the Ethernet connector

LAN activity
(yellow)

1　　8

Link status
(green)
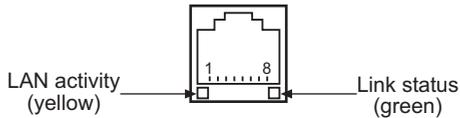
Table 9:　Pinouts for the Ethernet connector

Pin No.	Function
1	Tx +
2	Tx −
3	Rx +
4	N/C
5	N/C
6	Rx −
7	N/C
8	N/C

Appendix C—Specifications

Table 10:   Specifications

Item	Specification
Supply voltage	13.5 V DC nominal 10 to 15 V DC fully operational
Protection	Reverse polarity and overvoltage protected to ±50 V DC
Supply current	Backlight off: 250 mA @ 13.5 V DC Backlight on: 350 mA @ 13.5 V DC
Operating temperature	0 to +55°C
Relative humidity	0 to 95% non-condensing
Size	210 mm W × 240 mm D × 65 mm H (8.3 in W × 9.4 in D × 2.6 in H) (includes allowance for rear connectors)
Weight	2 kg (4.4 lb)
Sealing	IP64
Mounting	Free standing Flange Mobile mounting cradle

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Appendix D—Factory-default settings

The settings listed in Table 11 are loaded into the modem when you restore the factory profile (see page 65, *Resetting to factory defaults*). The factory settings for the default waveform (STANAG 4539) are listed in Table 12 on page 86.

Table 11:   Factory-default settings for the modem

Menu option	Setting	Value
Waveform		STANAG 4539 (for default settings see Table 12 on page 86)
Transceiver	Audio Level	–12 dBm
	PTT Control	Auto
	Duplex Mode	Half
Sync Settings	Tx Clock	Output
	Polarity	Normal
Async Settings	Speed Mode	Normal
	Data Bits	8
	Parity	None
	Stop Bits	1
	Data Flow Ctrl	CTS
	Data Rate	115 200 bps
	Polarity	Normal
	RTS Mode	Ignored

Table 11:   Factory-default settings for the modem

Menu option	Setting	Value
Test	Loop Mode	None
	Tx Data Source	External
Remote Control	DHCP	Off
	Base Port	50000
Data Port Mode		Async

Table 12:   Factory-default settings for the
STANAG 4539 waveform

Setting	Value
Transmit Rate	9600
Tx Interleaver	Short
Rx Int. Set	Short
TLC Blocks	7
Optional EOM	On
Rx Limit	32767

Appendix E—Compliance

This section contains the following topics:

Introduction

This section describes how to ensure the 3112 HF Data Modem complies with the European Electromagnetic Compatibility Directive 89/336/EEC and the European Low Voltage Directive 73/23/EEC as called up in the European R&TTE Directive 1999/5/EC.

This section also contains the requirements for FCC compliance.

European R&TTE Directive

The 3112 HF Data Modem has been tested and complies with the following standards and requirements (articles of the R&TTE Directive):

- Article 3.1b: EN301 489-1

- Article 3.1b: EN301 489-15

- Article 3.1a: EN60950-1

Product marking and labelling

Any equipment supplied by Codan that satisfies these requirements is identified by the CE0191⊙, CE0191 or CE markings on the model label of the product.

Declaration of Conformity

The CE Declaration of Conformity for the product is listed on page 99, *Associated documents*. This document can be made available upon request to Codan or a Codan-authorised supplier.

Electromagnetic compatibility and safety notices

Electromagnetic compatibility

To ensure compliance with the EMC Directive is maintained, you must:

❑ Use standard shielded cables supplied from Codan (where applicable).

❑ For Ethernet connections, a ferrite bead (Codan part number 39-79150-080) must be attached to the Ethernet cable as close as possible to the **Ethernet** connector on the modem.

❑ Ensure the covers for the equipment are fitted correctly.

CAUTION | If it is necessary to remove the covers at any stage, they must be refitted correctly before using the equipment.

Electrical safety

To ensure compliance with the European Low Voltage Directive is maintained, you must install and use the 3112 HF Data Modem in accordance with the instructions in this guide.

Earth symbol

A chassis earth connection point is provided on the 3112 HF Data Modem. The symbol shown in Table 13 is used to identify the earth on the equipment.

Table 13:   Earth symbol

Symbol	Meaning
	Chassis earth

FCC compliance

FCC Part 15 compliance

Any modifications made to the 3112 HF Data Modem that are not approved by the party responsible for compliance may void your equipment's compliance under Part 15 of the FCC rules.

The 3112 HF Data Modem has been tested and found to comply with the limits for a Class B device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by switching the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- reorient or relocate the receiving antenna

- increase the separation between the equipment and receiver

- connect the equipment into an outlet on a circuit different from that to which the receiver is connected

- consult the dealer or an experienced radio/TV technician for help

Appendix F—Definitions

Standards and icons

The following standards and icons are used in this guide:

This typeface...	Means...
BOLD/**Bold**	a button, switch or connector
Bold	a command that you enter or keyboard key that you press
`Courier`	a segment of text that is taken directly from a computer screen
Italics	a cross-reference or text requiring emphasis

This icon...	Means...
WARNING	your actions may cause harm to yourself or the equipment
CAUTION	proceed with caution as your actions may lead to loss of data, privacy or signal quality
NOTE	the text provided next to this icon may be of interest to you
❑	a step to follow

Acronyms and abbreviations

This acronym...	Means...
AGC	automatic gain control
ALE	automatic link establishment
CICS	computer interface command set
CTS	clear to send
DC	direct current
DCD	data carrier detect
DCE	data communications equipment
DL	double long
DSR	data set ready
DTE	data terminal equipment
DTR	data terminal ready
EMC	electromagnetic compatibility
EOM	end of message
ETSI	European Telecommunications Standards Institute
FCC	Federal Communications Commission
GND	ground
HF	high frequency
ICNIRP	International Commission on Non-Ionizing Radiation Protection
L	long
LAN	local area network
LED	light-emitting diode

This acronym...	Means...
M	medium
N/C	not connected
PC	personal computer
PTT	press-to-talk
R&TTE	radio and telecommunications terminal equipment
RMA	return material authorisation
RTS	request to send
Rx	receive
S	short
SNR	signal-to-noise ratio
TLC	transmit level control
Tx	transmit
TxD	transmit data
US	ultra short
USB	universal serial bus
VIH	voltage input high
VIL	voltage input low
VL	very long
VS	very short
Z	zero

Glossary

This term...	Means...
data communications equipment (DCE)	Equipment that either performs a function at the end of the line between the DTE and the line, or interfaces the DTE into a transmission circuit.
data terminal equipment (DTE)	Equipment that converts information into signals for transmission, or reconverts the received signals into information.
diversity	Duplication of data sent in frequency and/or time to improve the overall reliability of data transfer.

The MIL-STD-188-110B (39Tone) waveform offers both frequency and time/frequency diversity modes.

Tx and Rx diversity must be set to the same value. |
| end of message (EOM) | Sequence of data bits that represent the end of a transmission. The optional EOM is applicable to STANAG 4539 and MIL-STD-188-110B (serial tone) waveforms only. |
| interleaver | Process used by the modulator and demodulator to improve performance under fading conditions.

The Rx interleaver is set automatically by the demodulator from the received signal for MIL-STD-188-110A (including STANAG 4415) and STANAG 4539 waveforms. |

This term...	Means...
preamble length	Length of time that preamble is transmitted on a data stream. A shorter preamble reduces the delays and a longer preamble enables better acquisition of the received signal.
receive limit	Maximum number of interleave blocks that are received before the modem terminates reception. The carrier is not lost. Receive limit is applicable to STANAG 4539 and MIL-STD-188-110B (serial tone) waveforms only.
TLC blocks	Periods of signal with the same amplitude and spectral density as the modem data pump signal. These signals are sent to the transceiver at the start of the PTT frame to stabilize the transceiver's Tx gain control before sending data.
transceiver	The unit that modulates audio signals onto radio frequencies that may be transmitted on air, and that demodulates the radio frequencies it receives into audio signals.
transmit rate	The rate at which data is transmitted on air.

Units

Measurement	Unit	Abbreviation
Distance	metre (inch)	m (in)
Frequency	hertz	Hz
Impedance	ohm	Ω
Mass	gram	g
Rate of data transfer	baud	baud
Rate of data transfer	bits per second	bps
Temperature	degrees Celsius (degrees Fahrenheit)	°C (°F)
Time	second	s
Voltage	volt	V

Unit multipliers

Unit	Name	Multiplier
m	milli	0.001
d	deci	0.1
k	kilo	1 000
M	mega	1 000 000

About this issue

This is the first issue of the HF Data Modem 3112 User Guide.

Associated documents

Other publications associated with the HF Data Modem 3112 are:

- NGT Transceiver Getting Started Guide (Codan part number 15-04127-EN)

- NGT Transceiver Reference Manual (Codan part number 15-04126-EN)

- NGT *ASR* Transceiver Getting Started Guide (Codan part number 15-04137-EN)

- NGT *ASR* Transceiver Reference Manual (Codan part number 15-04138-EN)

- NGT *MR* Transceiver Getting Started Guide (Codan part number 15-04151-EN)

- NGT *MR* Transceiver Reference Manual (Codan part number 15-04150-EN)

- NGT *SRx* Transceiver Getting Started Guide (Codan part number 15-04140-EN)

- NGT *SRx* Transceiver Reference Manual (Codan part number 15-04141-EN)

- NGT Transceiver System Technical Service Manual (Codan part number 15-02063-EN)

- Manpack Transceiver 2110 series Getting Started Guide (Codan part number 15-04136-EN)

- Manpack Transceiver 2110 series Reference Manual (Codan part number 15-04135-EN)

- Manpack Transceiver 2110M Getting Started Guide (Codan part number 15-04153-EN)

- Manpack Transceiver 2110M Reference Manual (Codan part number 15-04152-EN)

- Fitting Instruction: 2110 Manpack Transceiver cradle 15-00140 (c/w Interface Adaptor) (Codan part number 15-00140-001)

- Manpack Transceiver 2110 series Technical Service Manual (Codan part number 15-02071-EN)

- Declaration of Conformity for the HF Data Modem 3112 (Codan part number 19-40284)

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