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Field Controller User Guide

Video, Accessories, Field Controller

Commercial in Confidence

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0. Preface

0.1 About this Document

This document contains relevant information required to identify, install and control the equipment or system.

Since the available functions are licensed and depend on the specific implementation, not all the functions and or applications contained in this document may be relevant or applicable to the system you will be working with.

The actual presentation may differ from those in this document due to hardware or software changes.

0.2 Who Should Read this Publication

This document is meant for anyone interested in how the system can best be used, but it is of most benefit to:

- **Operators** who are in charge of the daily operation of the equipment
- **Installers** who are responsible for the pre-installation, on-site installation and configuration of the system in the end-user environment
- **Maintainers** who are responsible for maintaining the equipment or system

0.3 Assumed Knowledge

Throughout this book it is assumed that the reader has a thorough knowledge of:

- Basic Personal Computer Operations
- Basic Radio Frequency (RF) Principles

0.4 Notice about Specifications

While DTC makes every attempt to maintain the accuracy of the information contained in its product manuals, the information is subject to change without notice. Performance specifications included in this manual are design-centre specifications and are included for customer guidance and to facilitate system installation. Actual operating performance may vary.

0.5 Notice about this Guide

The product described in this manual is subject to continuous development and improvement. All particulars of the product and its use (including the information and particulars in this guide) are given by DTC in good faith. However, it is acknowledged there may be errors or omissions in this guide.

0.6 Typographic Conventions

This document uses these typographic conventions to identify text that has a special meaning:

Typographic Convention	Example
TEXT in small capitals represents a specific key press on the console **keyboard** or hardware **panel**.	ESC, F1, SHIFT
The + sign means "hold down the first key while pressing the second key".	Press CTRL+C to abort
<Text> Serves as a placeholder for variable text that you will replace as appropriate to its context.	Use the filename <system_name>.sys for…
Text in **bold** emphasises a new word or term of significance.	We call this a **protocol** and its function is…
[-a] Text in these brackets indicates an optional component that can be left out.	Ls [-a]
NN This indicates a value entered on a **numeric keypad**.	45 on the numeric keypad
Successive menu selections are shown using **arrows** to indicate a sub-menu. In this example this would mean: Select the **Insert** menu, then select **picture**, then select **from file**.	**Insert>picture>from file**

0.7 Symbols

This document uses these symbols to highlight important information:

WARNING: A written notice given to a reader when a situation might result in personal injury or loss of life.

CAUTION: A written notice given when a situation might result in damage to or destruction of equipment or systems.

Note: A written notice given to draw the reader's attention to something or to supply additional information.

0.8 Trademarks

All trademarks or registered trademarks that appear in this document are the property of their respective owners.

0.9 Related Documents

You may also need to read:

Document	Source
Solo Concept Guide	DTC
IP Concept Guide	DTC

0.10 Document History

This document was written and produced by the DTC Technical Publications Team.

This is a change controlled document. Each main page of this document displays a revision number and date at the bottom left corner of the page. The revision is also indicated in the table below.

Changes to any page will raise the revision status of the whole document.

Revision	Date	Authors	Summary of Changes
1.0	27/11/2013	RC	First release
2.0	11/10/2016	IR	Upgrade instructions and DTC brand
3.0	14/10/2016	IR	Changes as per TECHP-188

Contents

1. Systems Description

The subject equipment of this User Guide is:

Equipment Title	Part Number
Field Controller	FCON

Figure 1-1 Field Controller

1.1 What is the Field Controller?

The DTC Field Controller is designed to provide operators of DTC equipment with a discrete and comprehensive controller, whilst avoiding the need to take a PC into the field.

The Field Controller has DTC technology at its core and connects to DTC equipment using a single cable, presenting you with a clear menu structure for configuration. The menu system can be navigated and selections made using the buttons provided on the front panel of the Field Controller.

As well as acting as a portable controller, it can also act as a remote agent for the DTC Crypto Wizard application. In this mode, the Field Controller can be pre-loaded with encryption keys destined for different DTC transmitters and receivers powered by DTC technology.

On connection to a target device the Field Controller will automatically update the encryption keys whilst logging the serial number, time and date of the update. The Field Controller therefore acts as a secure carriage mechanism for field management of encryption data.

1.2 What are the Key Features of the Field Controller?

The DTC Field Controller is a state of the art control device using serial connection technology for excellent results in field environments.

The Field Controller system enables the operator to:

- Control and configure DTC radio devices in the field
- Shuttle Encryption keys between a PC at base and a radio device in the field
- Upgrade radio devices in the field

About How the Field Controller is powered

When connected to the PC for collecting encryption keys or new software, the Field Controller takes its power from the PC via USB.

When connected to the DTC radio device to provide control for example, it takes its power from the device.

A Field Controller which is disconnected from any device cannot run as it has no internal power supply.

About Field Controller connected to a Personal Computer

The **Field Controller** connects to your **PC** with a CA0343 cable. You'll then use the **Field Commander Controller** software on your PC to communicate with the Field Controller.

You could also run **Crypto Wizard** on your PC and have the Field Controller download **keys** for later use.

Finally you could run **Mission Commander** software on your PC and use this tool to program your Field Controller.

About Field Controller connected to a Device

The Field Controller connects to your Radio Device with a CA0345 cable. You'll then use the **Field Controller** to change parameters on the radio like frequency and encryption keys. You could also upgrade your radio device firmware with the Field Controller, see *Firmware Updates* for details.

1.3 What are the Features and Benefits of the Field Controller?

It can be very useful to understand how the features of the unit yield tangible benefits to you. This table summarises these features and, more importantly, the benefits.

Features and Benefits Table

Key Features	Key Benefits
Simple one button, one joystick control panel built into a standalone inline controller.	Easy to use - Operations staff can make quick changes to reconfigure a DTC device.
Integral Encryption key shuttling at AES128 or AES256	Secure - Preserve your security of transmission with powerful, simple to operate encryption key transfer. Acts a s a remote client for Crypto Wizard software.
Controls transmitters and receivers with DTC technology at their core.	Better use of assets and resources - You can preset frequencies, COFDM constellations, video and audio settings etc. into any of eight presets. Configure the whole operation in the calm of the base then the operations staff just have to quickly select the preset with one button.
On Screen display and PC GUI	Software Driven - Simple and fast to deploy and operate – saves you time and cost.
High reliability and availability	Reduced maintenance requirement, reduced spares holding, resulting in significant cost benefits over the life of the system.
Low Mass and form factor	Suitable for covert operations in the field.

Table 1-1 What are the Features and Benefits

1.4 Getting an Overview of the Field Controller

Diagram: Field Controller Main System

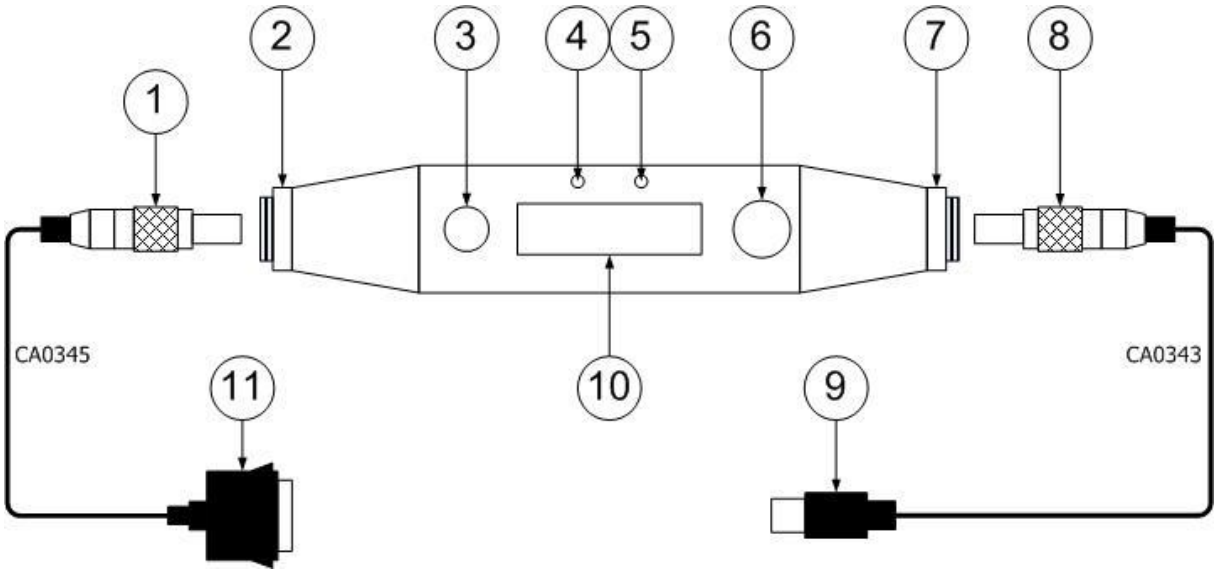


Figure 1-2 Main System Diagram

No	Item	Function
1	Lemo OB 5-way plug, pins CA0345 cable	This plug connects to the Device Connector (2). The other end is a Hirose for your unit.
2	Device connector	Your CA0345 cable connects here.
3	Cancel button	Each time you press the Cancel button the Field Controller steps back up one menu level.
4	Field Controller Alarm LED	Steady Red – Communication problem with connected device. Steady Green – Good communications with connected device.
5	Device Alarm LED	Steady Red – Alarm Condition on the device connected. Steady Green – Device is free of alarms.
6	Navigation Button	Press the Navigation button in to select menus or options. Move the Navigation button up and down to move between menus or change options. Move the Navigation button left and right to select numbers/letters when editing values.
7	PC Connector	Your CA0343 cable connects here.
8	Lemo OB 6-way plug, pins, CA0343 cable	This plug connects to the PC Connector (7). The other end is a USB plug for your PC.

No	Item	Function
9	USB 4-way plug, pins, CA0343 cable	This plug connects to your **PC**. This would normally be running the Mission Commander software you'll use to configure your Field Controller.
10	Display Screen	Two line, Organic Light Emitting Diode (OLED) display.
11	Hirose 16-way plug, pins, CA0345 cable	This plug connects to your **device**. This could be a SOLO4 Transmitter or SOLO4 Receiver for example.

Table 1-2 Main System Diagram Key

Note: Item 11 is shown as the CA0345 Hirose variant in this example but it *could* be one of several different cables to suit the unit being connected to the Field Controller.

Troubleshooting

☹ I don't know what you mean by the word **device**!

☺ The Field Controller can work with lots of different types of kit like SOLO4 Transmitters, NETNode etc. To keep things simple, we just call all these things **devices**.

☹ I want to use my Field Controller with a Rugged NETNode but the CA0345 cable only has a Lemo plug on the unit end!

☺ The CA0345 cable fits *most* of the kit we make so we include it with the Field Controller cable bundle. For those with a rugged NETNode we make the CA00549 Mesh Field Controller External Cable Assembly. It has an Amphenol plug on the unit end to hook into your rugged NETNode.

We actually make a few different cables:

Part No	Item	What can I Control?
CA0344	Bodywire Field Controller Breakout Cable	Bodywire Transmitter
CA0345	D510 Field Controller Control Cable	SOLO4 Transmitter SOLO4 Receiver SOLO5 Transmitter DogCam
CA0346	Field Controller 3-way External Control Cable	
CA0549	Mesh Field Controller External Cable Assembly	Phase 2 Robust NETNode Phase 3 Robust NETNode

Table 1-3 Field Controller Cables

2. Getting Started

2.1 Identifying your Device

There is only one type of device described in this User Guide. This is a Field Controller.

Designation: FCON

Size: 110mm (L) x 21mm (W) x 15mm (H)

Weight: Around 35g

Operating Temperature: -10°C to +50°C

Power Consumption: 20mA at 12V

Internal battery: 3 year life.

Figure 2-1 Identifying your Field Controller

2.2 Unpacking your Field Controller

Carefully open the packaging and remove the device. Verify that all the components have been included in the package as shown in the packing list. Inspect the unit for shipping damage.

Retain the packing list and all the packing materials for storage.

The codes on the picture mean:

- CA – Cable Assembly
- SA – Sub Assembly
- AP – Assembly Part

The codes are useful to you if you need to order a new cable sometime.

Diagram: Unpacking your Field Controller

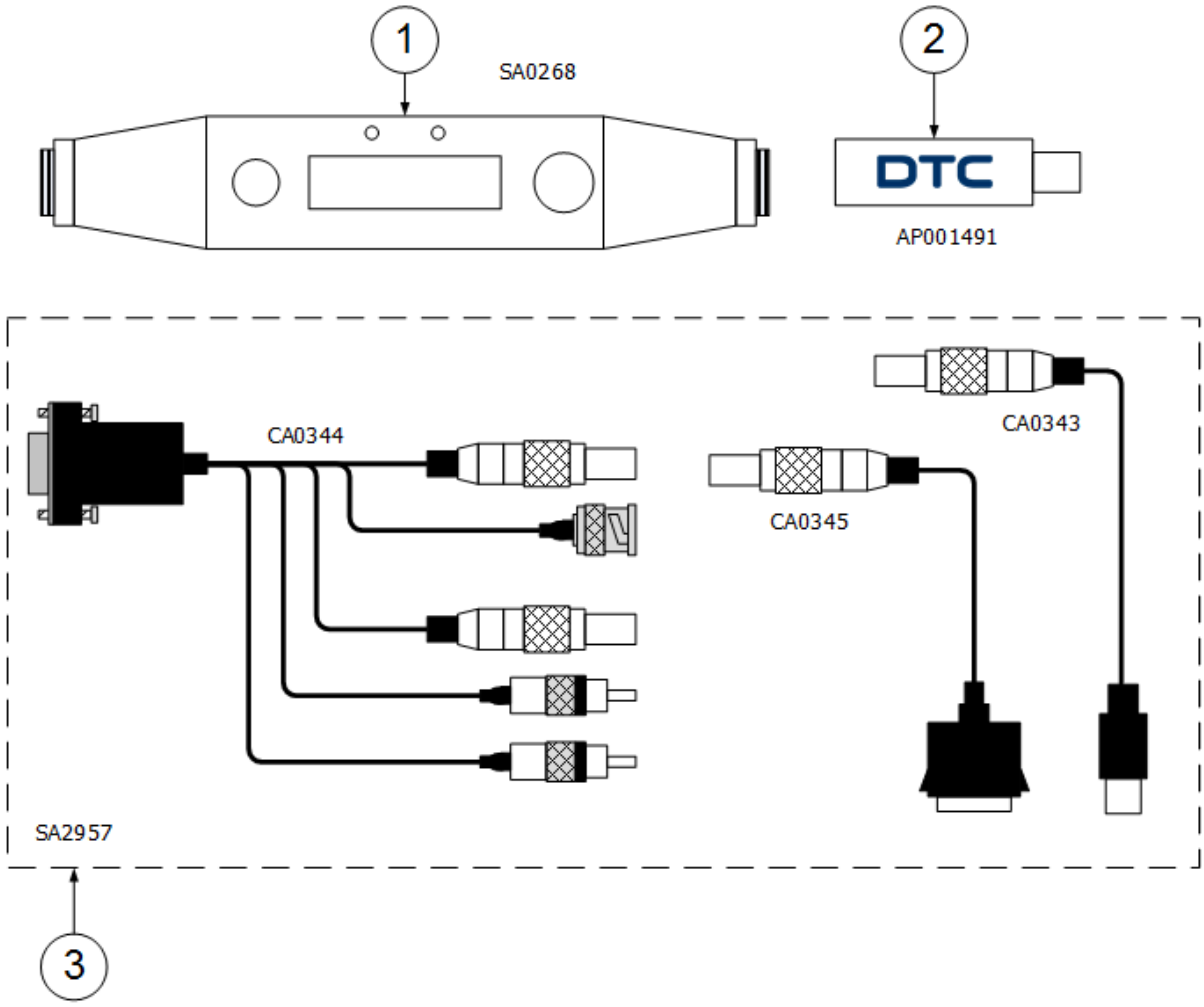


Figure 2-2 Field Controller Packing Diagram

No	Item	Notes
1	Field Controller	Part code is FCON. We'll call it a **Field Controller** in this User Guide.
2	Field Controller support software (AP001491)	This software is loaded onto a 1GB stick (Part number: AP001694). Comprises: Field Controller Control Application, FCON-CON. SOLO4 Front Panel Emulation, FCON-EMU.
3	Cable Bundle (SA2957)	FCON External Cable Bundle (SA2957) Comprises: Field Controller USB cable (CA0343) Bodywire Field Controller Breakout cable (CA0344) D510 Field Controller Control Cable (CA0345)

Table 2-1 Parts in the Field Controller Package

Troubleshooting

☹ I don't have all the parts you described!

☺ Call your DTC contact right away and we'll get this solved for you.

DTC – Solent Fusion 2 1100 Parkway, Solent Business Park Whiteley, Hampshire PO15 7AB, England	+44 (0)1489 566 750

2.3 About the Label on your Field Controller

Which model do I have? What is its Serial Number?

This topic contains information covering placards, labels, markings, etc., showing the part number, legend and location of each placard, label, or marking required for safety or maintenance significant information.

Step 1: Identify the Product Label

Diagram: Field Controller Label

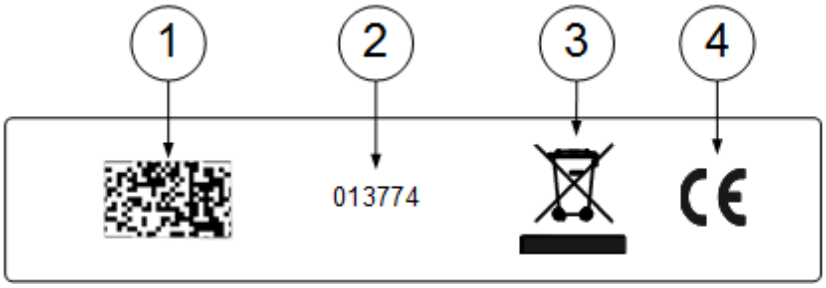


Figure 2-3 Field Controller Label

No	Item
1	Two-dimensional barcode of the serial number.
2	Six digit serial number. This may be needed during a support call.
3	Disposal mark.
4	The **CE marking** (also known as **CE mark**) is a mandatory conformity mark on many products placed on the single market in the European Economic Area (EEA). The **CE marking** certifies that a product has met EU consumer safety, health or environmental requirements.

Table 2-2 Field Controller TX Label Key

2.4 Planning the Hardware Installation

There are some general considerations for the installation of any electronics device or system. Not all of these may apply to your installation but are worth noting:

- Space – leave enough room to allow for cable bending and servicing
- Proximity to other devices (for example, source equipment)
- Length of cable runs – try to keep cables short
- Environmental conditions (temperature, humidity, etc.)
- Access for service repair
- Compliance with local regulations

2.5 Identifying the Variants of Field Controller

Step 1: Identify the Variants

Part Number	Equipment Title
FCON	Field Controller
FCON-NETNODE-P	Frequency and Encryption Management Controller for NETNode P
FCON-NETNODE-R	Frequency and Encryption Management Controller for NETNode R

Table 2-3 Field Controller Variants

2.6 Identifying the Options of Field Controller

The FCON has **one** type of option:

- Licensing Option

The Licensing Option

Part Number	Equipment Title
FCON-CRYPT	Field Controller Crypto Wizard

Table 2-4 FCON Licensing Option

2.7 About the Software with your Field Controller

The Field Controller has **two** software elements:

- **Firmware** that runs inside the device on the D588 board
- **Mission Commander** that you run on your Windows PC

About the Firmware

Although much of the unit is built up of hardware components, many of the sophisticated features are implemented in firmware running on the D588 board.

When you need to perform an internal software upgrade we provide an installer pack which contains all the code you'll need to do this easily.

About the Control Application

For more sophisticated operations and configuration tasks you'll connect up a PC running the **Mission Commander** application.

Here's what the Mission Commander looks like:

Screenshot: Mission Commander

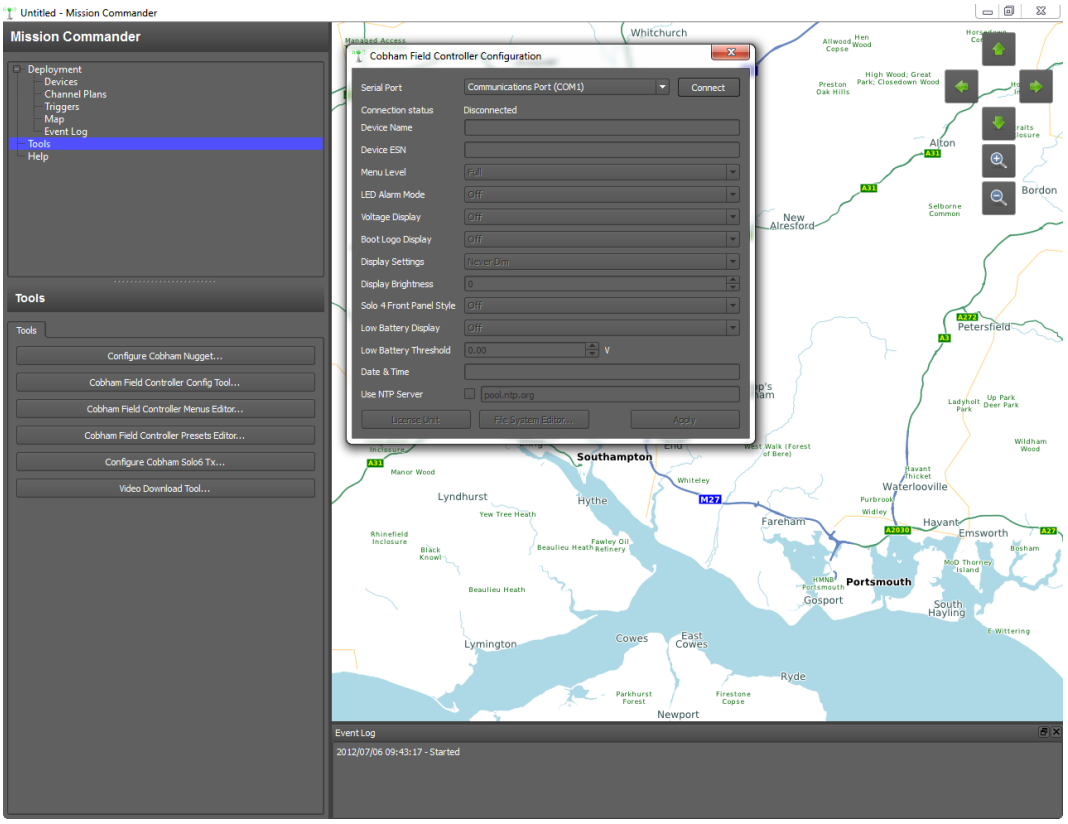


Figure 2-4 Mission Commander

3. Controls, Connections and Indicators

3.1 About Controls, Connections and Indicators

You'll need to be able to find all the **controls** and **connections** on the unit. You'll also need to be able to identify and interpret any **alarms** or **indicators**. The following topics will help you identify all these features.

Each Field Controller has **front, left,** and **right** panels which contain all the interface connections for the units and the controls and indicators. There is an **operational control panel** on the front of the unit.

3.2 Exploring the Front Panel

Diagram: Front Panel

Figure 3-1 Field Controller Front Panel

No	Item	Used for...
1	Two line OLED display.	User interface.
2	Field Controller Alarm LED.	Steady Red – Communication problem with connected device. Steady Green – Good communications with connected device.
3	Device Alarm LED.	Steady Red – Alarm Condition on the device connected. Steady Green – Device is free of alarms.
4	Scroll Arrows.	Indicates there are menu items above and below this item.
5	Navigation Button.	Press the Navigation button in to select menus or options. Move the Navigation button up and down to move between menus or change options. Move the Navigation button left and right to select numbers/letters when editing values.
6	Enter Symbol.	Indicates you may press the centre of the Navigation Button to enter the function.

No	Item	Used for...
7	Cancel Symbol.	Indicates you may press the Back Button to move up one level of the menu.
8	Cancel Button.	Each time you press the Cancel button the Field Controller steps back up one menu level.

Table 3-1 Field Controller Front Panel Key

3.3 Exploring the Left Panel

Diagram: Left Panel

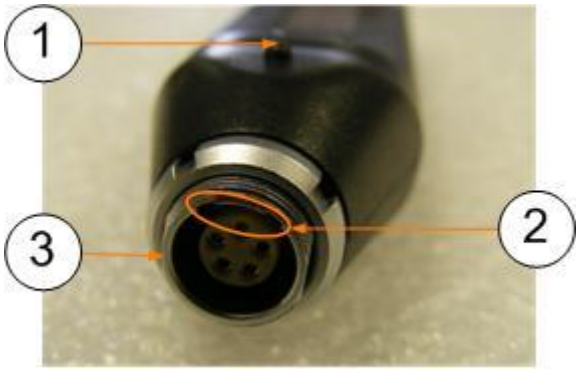


Figure 3-2 Field Controller Left Panel

No	Item	Used for...
1	Raised Tactile mark (1).	Easy to identify in darkness.
2	Twin Keys.	Ensures only the correct plug can insert to this receptacle.
3	Lemo OB 5-way receptacle (Sockets).	You connect the device you want to control to this receptacle.

Table 3-2 Field Controller Left Panel Key

3.4 Exploring the Right Panel

Diagram: Right Panel

Figure 3-3 Field Controller Right Panel

No	Item	Used for...
1	Raised Tactile marks (2).	Easy to identify in darkness.
2	Single Key.	Ensures only the correct plug can insert to this receptacle.
3	Lemo OB 6-way Receptacle (Sockets).	You connect your PC to this Receptacle.

Table 3-3 Field Controller Right Panel Key

3.5 Exploring the Indicator System

Before you Begin

You'll need:

- A powered Field Controller.

Step1: Interpret the Field Controller Alarm LED

No	Name	Notes
1	**Field Controller Alarm** LED. Shows a steady green or steady red aspect.	Steady Red – Communication problem with connected unit. Steady Green – Good communications with connected unit.

Step2: Interpret the Device Alarm LED

No	Name	Notes
1	**Unit Alarm** LED. Shows a steady green or steady red aspect.	Steady Red – Alarm Condition on the unit connected. Steady Green – Unit is free of alarms.

3.6 Exploring the Control Panel

Before you Begin

You'll need:

- A powered Field Controller.

Step1: Push the Cancel Button

No	Name	Notes
1	Cancel Button.	Each time you press the **Cancel** push button the Field Controller steps back up one menu level.

Step2: Push the Navigation Button

No	Name	Notes
1	Navigation Button.	Press the Navigation button in to select menus/options. Move the Navigation button up and down to move between menus or change options. Move the Navigation button left and right to select numbers/letters when editing values.

3.7 About the Power Connections

This topic describes connecting systems designed mainly for transporting electric power to the communication system equipment. This includes connecting elements, wires, fuses, over-voltage protection and breakers.

DC Power

The Field Controller does not have any batteries on board and does not have an AC adapter. The only way it gets it power is from the device to which it is connected.

For example, when connected to a PC using the Lemo 0B 6-way jack on the right hand side of the device, the Field controller takes its power from the PC using the USB.

If the Field Controller is only attached to a Unit (like a transmitter or receiver), it takes its power from that.

So, a Field Controller cannot work alone, it must be connected to either a PC or a radio unit or both.

3.8 About the Control Connections

This topic describes connecting systems designed mainly for controlling and configuring the radio devices. This could be Serial Control Data (RS232 or RS485) or IP.

RS232 Serial Control

The Field Controller uses Serial Control Data (RS232) to communicate with both the PC and any radio device to which it is connected.

4. Setting up your Field Controller

4.1 Connecting DC Power from your PC

The Field Controller cannot power itself. It takes its power from either a PC or the unit to which it is connected. In this example we'll connect the Field Controller to your PC.

Before you Begin

You'll need:

- A Field Controller
- A PC with a USB port available
- A CA0343 Field Controller USB cable

Step 1: Connect the Field Controller to your PC

1. Connect the Lemo OB 6-way plug on the CA0343 cable to the right hand jack of the Field Controller.
2. Connect the USB plug on the CA0343 cable to your PC's USB port.
3. You'll see the display and one or two LEDs illuminate on the Field Controller.

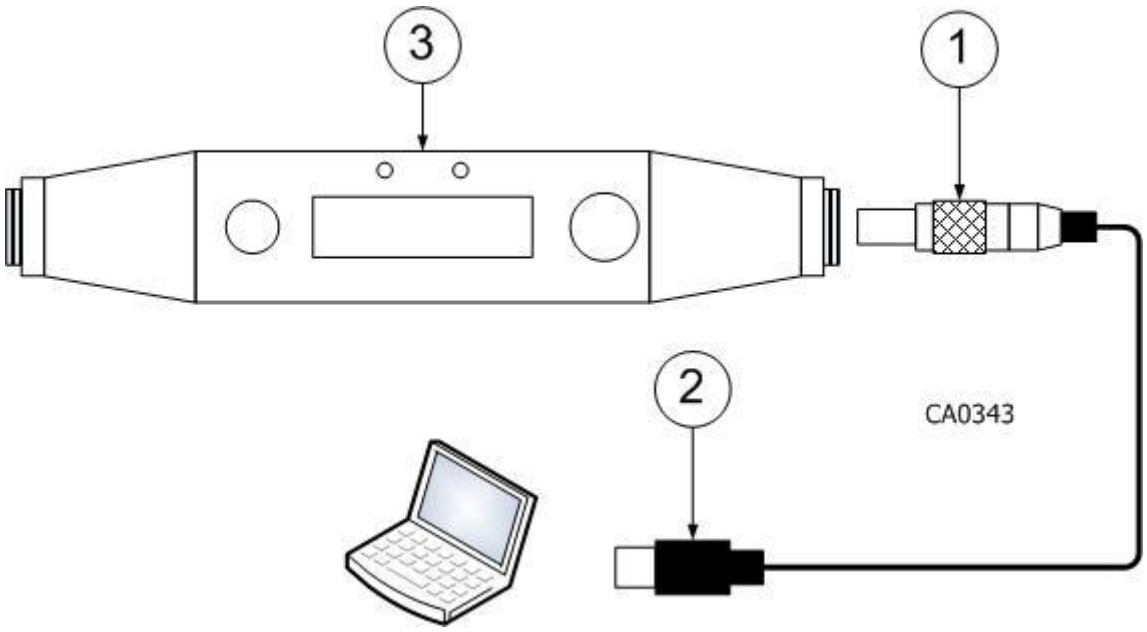


Figure 4-1 Connect the Field Controller to your PC

Troubleshooting

☹ My Field Controller display didn't come on!

☺ Some PCs have USB ports which are not powered. Try another port or try another PC.

☹ I tried other ports and PCs and still my Field Controller display didn't come on!

☺ Check you have the right cable (CA0343) and it's in the correct end of the Field Controller.

4.1 Exploring the Display

You're all powered up and the display screen is showing some text and symbols. You need to know what it all means.

The Field Controller could be displaying just about anything at this moment. It's completely dependent on how the thing has been programmed to start up.

Before you Begin

You'll need:

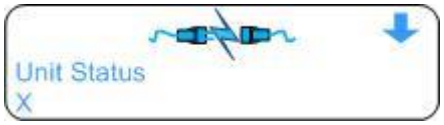
- A Powered Field Controller

Step 1: Get back to Home

1. Press the **Cancel** button until you see something like this:

Step 2: Enter the Menu Structure

1. Press the **Navigation** button once. You'll see something like this:



Step 3: Play

We think you should spend a few minutes playing with the **Navigation** and **Cancel** buttons to find your way around the **menu structure**. When you get lost, just press the Cancel button until you see that home menu again.

Step 4: Understand the Symbols

During your trip round the display screen you'll encounter a bunch of symbols:

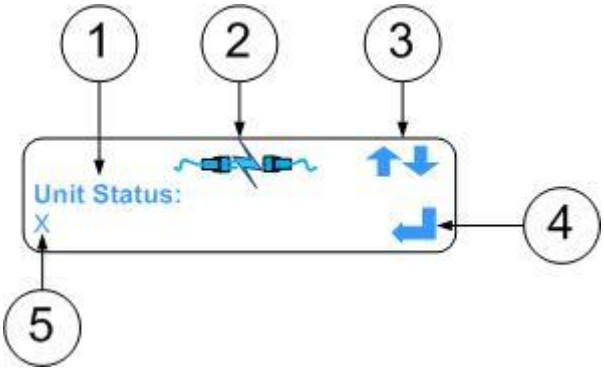


Figure 4-2 Field Controller Display

No	Name	Notes
1	Two line display screen	This example shows the Unit Status menu on line two.

No	Name	Notes
2	No Connection to Unit	Tells us we have no link with a unit to control – remember that could be a SOLO4 TX, NETNode etc.
3	Scroll Arrows	You'll only see the up arrow if up is the only way you can go. Same with the down arrow. You'll see both arrows if there are menu items above and below this point.
4	Enter Symbol	Means we can press the Navigation button to enter a sub-menu or accept a change we've made. You'll only see it if there is something to enter or accept.
5	Cancel Symbol	Means we can press the Cancel button to go back up one menu level. You'll only see this if there is somewhere higher to go in the menu.

Table 4-1 Field Controller Display Key

Troubleshooting

☹ I get completely lost in the menu structure!

☺ The first time you mess with this thing it can seem confusing. After a couple of minutes and a glance at the menu structure below you'll soon be navigating with confidence!

4.2 Exploring the Menu Structure

You've been hacking around the menus, got lost a few times and now you really want to know what is where in the menu. Right, let's do that.

Before you Begin

You'll need:

- A Powered Field Controller

Step 1: Get back to Home

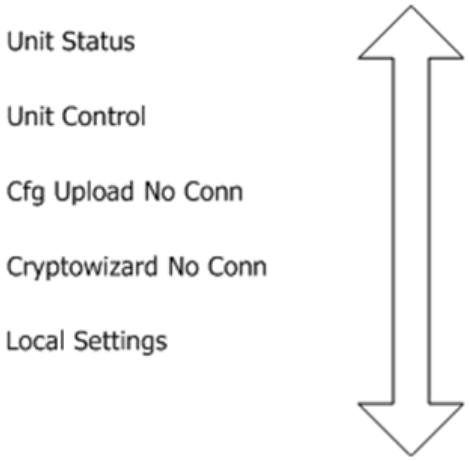
1. Press the **Cancel** button until you see something like this:

Step 2: Enter the Menu Structure

1. Press the **Navigation** button once. You'll see something like this:

Step 3: Navigate the Top Level Menu Structure

Use the Navigation button UP and DOWN function to move up and down the menu tree. Here are all the possible items you could find:



This is the menu from a Field Controller with all the possible items loaded up.

Your menu will probably be much shorter.

You will always have Unit Status and Local Settings in your menu structure.

Remarks

Notice as you scroll up and down that you only get the **Enter** symbol for **Local settings**.

This is because the Field Controller is not connected to a Unit right now. It therefore cannot show you Unit Status and cannot perform Unit Control.

You can also see that Cfg Upload and Cryptowizard show No Conn.

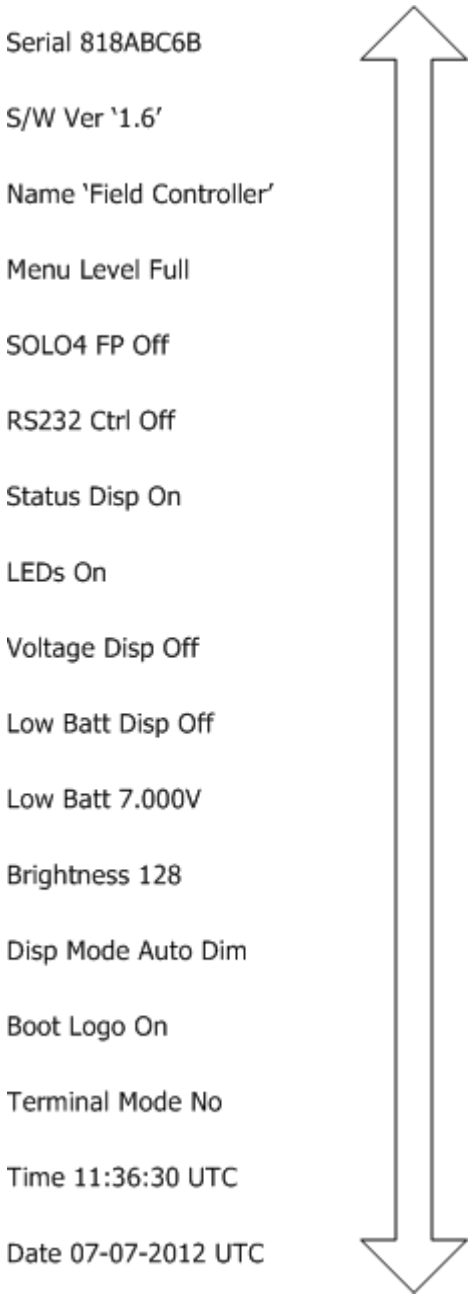
The only menu you can get into right now is **Local Settings**.

Step 4: Navigate the Local Settings Menu Structure

Use the Navigation button UP and DOWN function to move up and down the menu tree until you get to **Local Settings**.

Notice the enter symbol has illuminated? **Press** the Navigation button to enter this menu.

Use the Navigation button UP and DOWN function to move up and down the Local Settings menu tree. Here's what you'll find:



This is the Local Settings sub-menu from a Field Controller.

Your sub-menu should have all the same items as mine but of course the field values might be different.

For example my SOLO4 FP setting is OFF, yours may be ON.

This really doesn't matter just now as we're only learning how to navigate.

Also, don't get worried about what all these fields mean, I'll show you all that detail later.

4.3 Making a Change to a Menu Item

Step 1: Make a Simple Change to a Sub-Menu Item

1. Navigate to **Local Settings>LEDs** and press **Enter**.
2. You are now ready to make a change to the **LEDs** sub-menu item.
3. Use the Navigation button UP and DOWN function to move up and down the choices for LEDs. (You only get On or Off)
4. Choose **OFF** and **press** the Navigation button to **accept**.
5. Your LEDs will turn off – excellent!
6. You really need those LEDs showing so let's turn them back on – you know how...

Step 2: Make a Number Change to a Sub-Menu Item

1. Navigate to **Local Settings**>**Brightness** and press **Enter**.
2. You are now ready to make a number change to the **Brightness** sub-menu item.
3. Use the Navigation button LEFT and RIGHT function to move the cursor block over any digit.
4. Use the Navigation button UP and DOWN function to increase or decrease the digit under the cursor block.
5. When done, press the Navigation button to accept the change.
6. For practice, set the brightness to 081.

Remarks

You'll use this ability to make changes in sub-menu items everywhere you go in Field Controller.

5. Basic Operation – Front Panel Emulation

5.1 Configuring your Field Controller for Front Panel Emulation

Conditions

You have a SOLO4 Transmitter and you want to control its front panel remotely using your Field Controller.

Remarks

SOLO4 Transmitters (and lots of other kit we make) have a Front Panel which you can use to select modes, configurations and switch the RF on or off.

You can use the Field Controller as a Front Panel Emulator which means you can connect it to a unit like a SOLO4 and control it as if you were using the panel itself.

Why? Imagine you have hidden a SOLO4 Transmitter but left the control cable dangling where you can easily get at it. You could creep up in the dead of night, plug the Field Controller into the hidden transmitter's cable and drive the front panel to change say, a configuration.

Before you Begin

You'll need:

- A powered SOLO4 Transmitter
- A CA0345 D510 Field Controller Control Cable
- A Field Controller that has been licensed for SOLO4 Front Panel Emulation.

Step 1: Connect the Field Controller to the SOLO4 Transmitter

1. Connect the Lemo OB 5-way plug on the CA0345 cable to the left hand jack of the Field Controller.
2. Connect the Hirose plug on the CA0345 cable to your SOLO4 transmitter's Hirose port.
3. The display should be on; the left LED should be green telling us we are successfully connected to the unit. The right LED could be red or green depending on the alarm state of the unit – it doesn't matter.

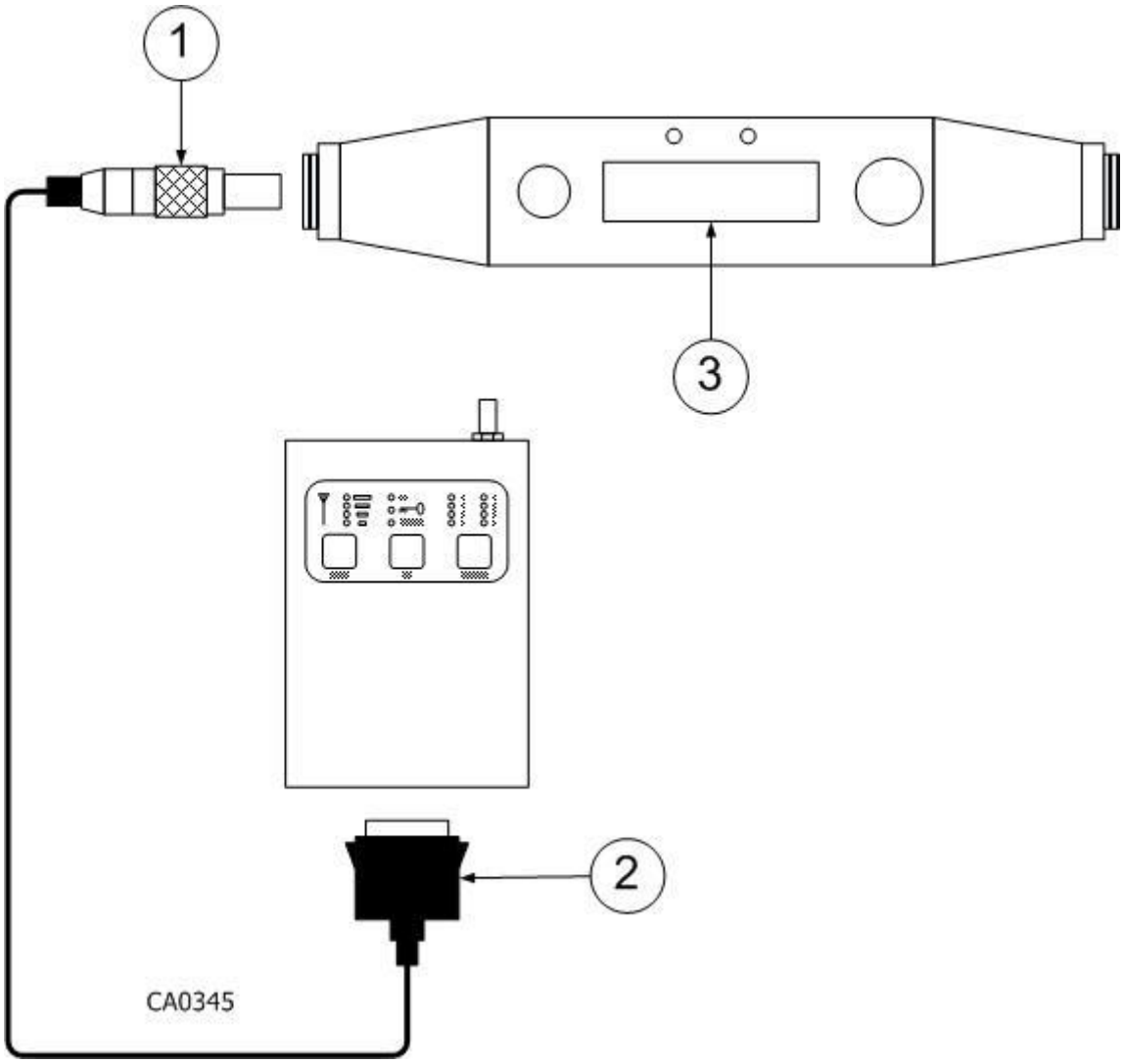


Figure 5-1 Connect the Field Controller to your Device

Step 2: Switch SOLO4FP On

On the Field Controller, navigate to **Local Settings>SOLO4 FP** and press the Navigation button to enter the sub-menu.

Choose ON and press the Navigation button to accept the change.

Press the **Cancel** button a couple of times until you see this Front Panel Emulation display.

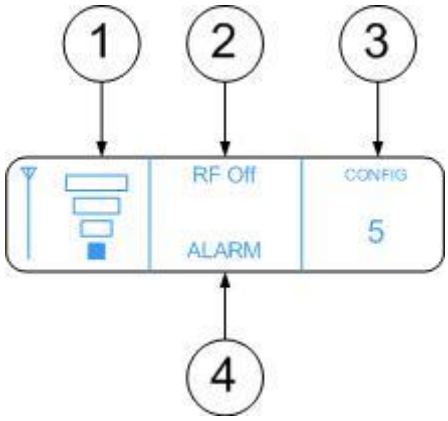


Figure 5-2 Front Panel Emulation Display

No	Item	Note
1	Mode display	These four bars mimic the four lights on your SOLO4 Transmitter. The lower bar is illuminated which means the transmitter is in short range mode.
2	RF Status	RF is off in this example.
3	Config	The unit is in Config 5 right now. It could be any number from 1 to 16 for some units, 1 to 8 for others.
4	Alarm Status	The alarm caption is on in this example which mimics the alarm light on the SOLO4 transmitter. This means there is no video signal getting to the transmitter, (not plugged in, camera turned off etc.).

Table 5-1 Front Panel Emulation Key

Troubleshooting

☹ My display screen did not show the same as the picture here!

☺ Yes, it might not. Your transmitter could be RF on and in Config 1 with Medium range mode selected. Look at **your** SOLO4 **actual** front panel and compare it with the Field Controller front panel emulation to see that they show the **same** information.

Make a change on your SOLO4 transmitter front panel and it will be reflected on the Field Controller.

☹ I navigated to **Local Settings>SOLO4 FP** but I could not set the Field Controller to be in SOLO4 FP On.

☺ This means your Field Controller is not licensed for Front Panel Emulation. It's an easy fix though. Call your DTC contact right away and we'll get this sorted. DTC will send you a tiny *.lic file to install in your Field Controller. How? I'll tell you later; it's really easy to do.

5.2 Using Front Panel Control with SOLO4 Transmitter

Conditions

You have configured your Field Controller for Front Panel Emulation and it is hooked up to a SOLO4 Transmitter. You want to control the SOLO4 transmitter using your Field Controller.

Remarks

The Field Controller in Front Panel Emulation mode can do all of the things you can do with a conventional front panel on a SOLO4 transmitter. We'll run though these control actions now.

Before you Begin

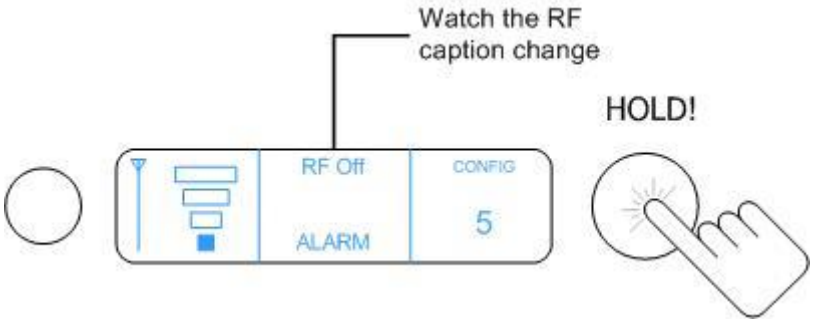
You'll need:

- A fully powered Field Controller.

Step 1: Switch RF ON and OFF

1. Ensure the Field Controller is displaying the Front Panel Emulation Screen. Press the Cancel button a couple of times until it appears.

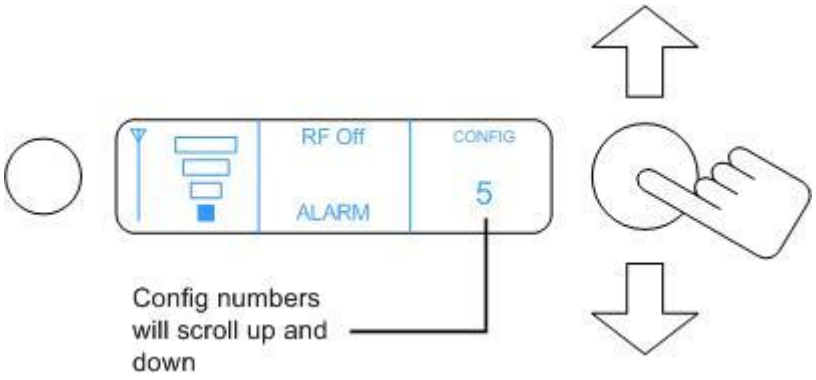
2. Press and **hold** the Navigation button until the RF status changes to ON. Do the same action to toggle the RF OFF.



Note: The green RF light on the actual transmitter and the RF Status caption on the Field Controller follow each other.

Step 2: Change Configurations

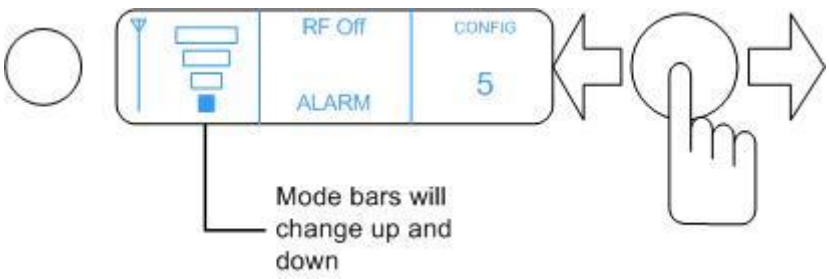
1. Use the Navigation button UP and DOWN function to move up and down the Config numbers on the right side of the display. You'll see a block cursor behind the numbers as you scroll.
2. When you see the config you want, press the Navigation button briefly to accept the change.



Step 3: Change Modes

Use the Navigation button LEFT and RIGHT function to move up and down the Mode bars on the left side of the display. You'll see a block cursor behind the bars as you scroll.

When you see the mode you want, press the Navigation button briefly to accept the change.

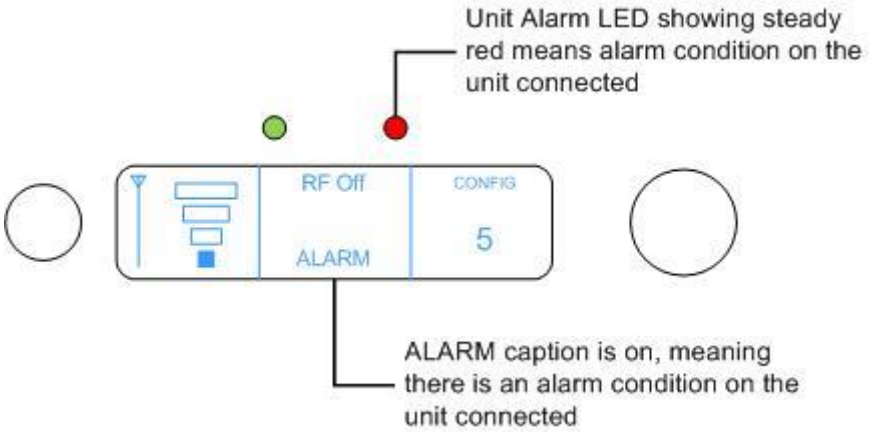


Step 4: Observe the Alarm Caption

You'll probably see the ALARM caption on the Field Controller and the Unit Alarm LED will be red. Take a look at the SOLO4 transmitter and you should see that its red alarm light is illuminated too.

This all means that there is no video signal present at the transmitter.

Supply a source of video to the transmitter's AV port and all the red lights and the ALARM caption will vanish.



Troubleshooting

☹ My display screen did not show the Front Panel Emulation screen even though I pressed the Cancel button a few times!

☺ Have you configured your Field Controller for Front Panel Emulation? It's in *Basic Operation*, Configuring your Field Controller for Front Panel Emulation.

☹ I don't have SOLO4 Transmitters!

☺ Using the exact same cable (CA0345) you can also control SOLO4 Receiver, SOLO5 Transmitter and DogCam etc. A CA0344 hooks you up to a Bodywire transmitter. Finally, the CA0549 connects the Field Controller to Phase 2 or 3 Robust NETNodes.

5.1 Working with the Unit Status Menu

Conditions

Your Field Controller is hooked up to a SOLO5 Transmitter and you are ready to explore the Unit Status menu.

Before you Begin

You'll need:

- A powered SOLO5 Transmitter
- A CA0345 D510 Field Controller Control Cable
- A Field Controller that has been licensed for Unit Control.

Remarks

You can use your Field Controller to **look at** the current status of the unit you have connected. You may want to do this to check frequencies and other important settings on your unit without changing any settings by accident.

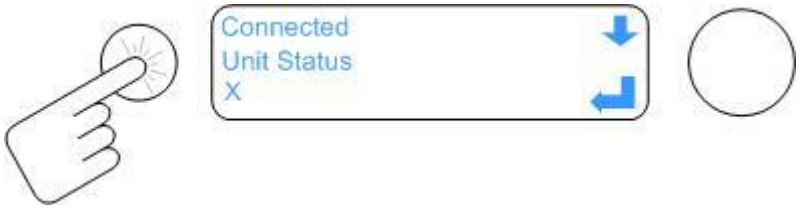
Let's use the example of a Field Controller reading the status for a SOLO5 Transmitter.

Step 1: Connect the Field Controller to the SOLO5 Transmitter

1. Connect the Lemo OB 5-way plug on the CA0345 cable to the left hand jack of the Field Controller.
2. Connect the Hirose plug on the CA0345 cable to your SOLO5 transmitter's Hirose port.
3. The display should be on; the left LED should be green telling us we are successfully connected to the unit. The right LED could be red or green depending on the alarm state of the unit – it doesn't matter.

Step 2: Get back to Home

1. Press the **Cancel** button until you see something like this:

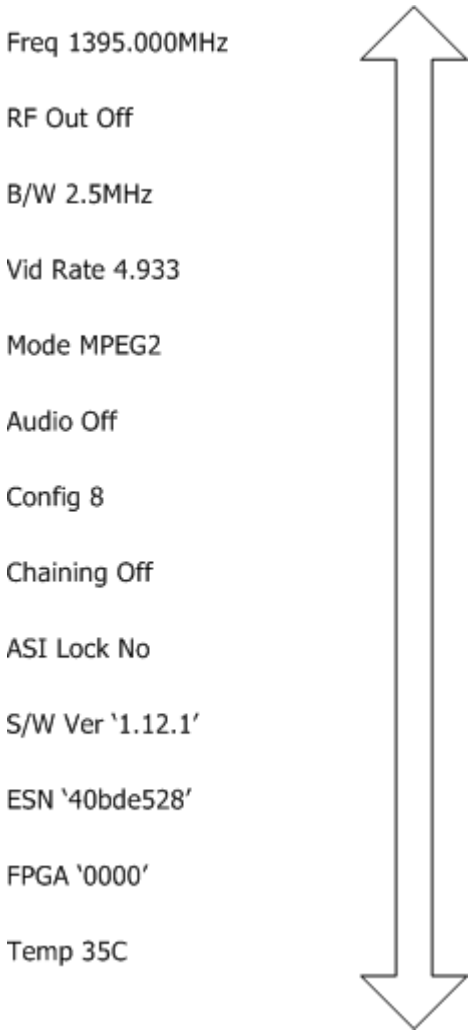


Step 3: Enter the Unit Status Menu Structure

Press the **Navigation** button once to enter the Unit Status sub-menu. You'll see something like this:

Step 4: Navigate the Unit Status Menu Structure

Use the Navigation button UP and DOWN function to move up and down the menu tree. Here are all the possible items you could find for a SOLO5 Transmitter for example:



Remarks

This is the Unit Status sub-menu from a Field Controller connected to a SOLO5 Transmitter.

Your sub-menu should have all the same items as mine but of course the field values might be different.

For example my Freq is 1395, yours may be 2495 or whatever.

What appears in this menu also depends on the unit you are connected to. A NETNode would look quite different.

This really doesn't matter just now as we're only learning how to navigate this menu.

Scroll up and down this menu until you are familiar with the fields.

Try pressing the Navigation button when you are on a field name.

Notice how you cannot enter the field and so cannot change the parameter.

So, the Unit Status menu just **displays** stuff – we can't change anything by mistake.

Step 5: Understand what is in the Unit Status Menu

The fields displayed are relevant only to the device to which you have your Field Controller connected.

As you scroll over each field, it reports its current setting. Looking at my example above you'll see the Vid Rate is 4.933 for this transmitter.

Troubleshooting

☹ I see all these fields and their values but I don't know what they actually mean!

☺ The Field Controller can be used with so many different DTC devices if I described all the fields you might encounter you wouldn't be able to carry this book. Besides, if you only own SOLO5 transmitters what do you care about NETNode fields?

Each product User Guide has a full and thorough explanation of every field and I recommend you grab the manual for the unit you hooked your Field Controller up with.

Call your DTC contact right away and we'll get you the User Guide you need.

5.1 Working with the Unit Control Menu

Conditions

Your Field Controller is hooked up to a SOLO5 Transmitter and you are ready to explore the **Unit Control** menu and make some changes to the transmitter's settings.

Before you Begin

You'll need:

- A powered SOLO5 Transmitter
- A CA0345 D510 Field Controller Control Cable
- A Field Controller that has been licensed for Unit Control.

Remarks

You can use your Field Controller to **change** the current status of the radio unit you have connected. You may want to do this to change frequencies and other important settings on your radio unit.

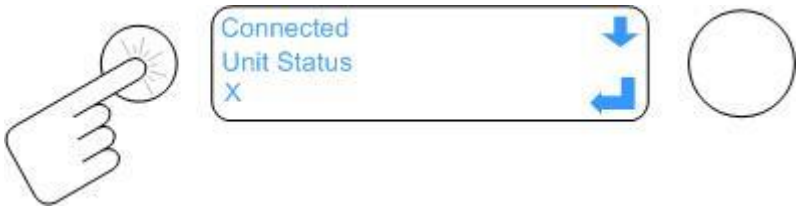
Let's use the example of a Field Controller **changing** the status for a SOLO5 Transmitter.

Step 1: Connect the Field Controller to the SOLO5 Transmitter

1. Connect the Lemo OB 5-way plug on the CA0345 cable to the left hand jack of the Field Controller.
2. Connect the Hirose plug on the CA0345 cable to your SOLO5 transmitter's Hirose port.
3. The display should be on; the left LED should be green telling us we are successfully connected to the unit. The right LED could be red or green depending on the alarm state of the unit – it doesn't matter.

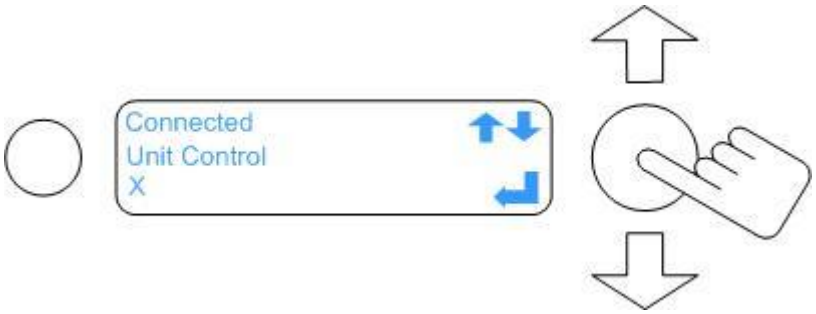
Step 2: Get back to Home

4. Press the **Cancel** button until you see something like this:



Step 3: Navigate to the Unit Control Menu

Use the Navigation button UP and DOWN function to move up and down the menu tree until you find the **Unit Control** menu.



Step 4: Enter the Unit Control Menu Structure

Press the **Navigation** button once to enter the **Unit Control** sub-menu. You'll see something like this:

Step 5: Navigate the Unit Control Menu Structure

Use the Navigation button UP and DOWN function to move up and down the menu tree.

This is just the second layer of the menu. If you press the Navigation button on any of these sub-menu items you'll go down one more layer. For example when you have RF displayed as above and you press the Navigation button you'll enter the RF sub-menu.

A picture will make it all very clear.

Here are all the possible items you could find for a SOLO5 Transmitter for example:

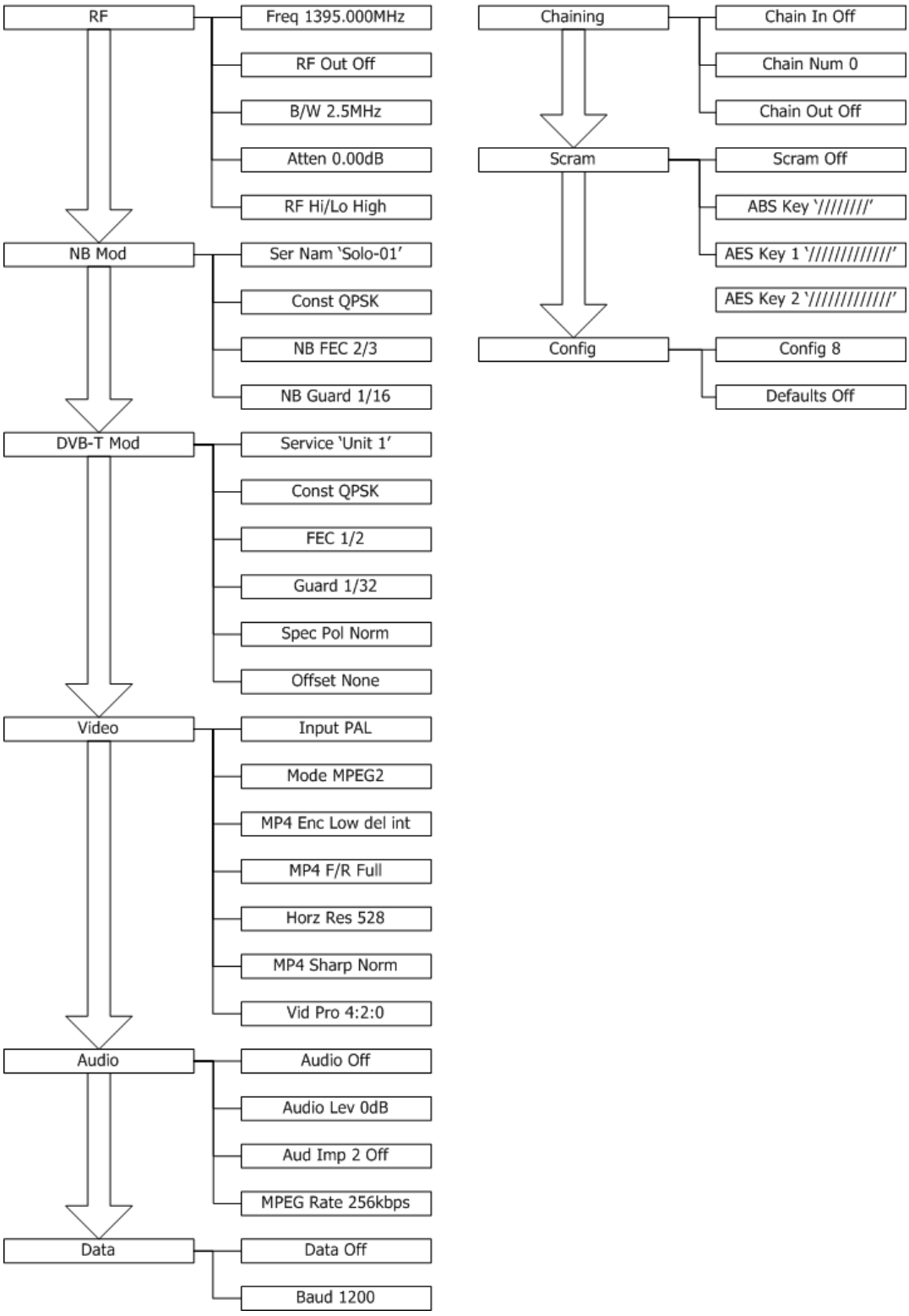


Figure 5-3 Unit Control Menu Structure

Step 6: Make a Simple Change to a Sub-Menu Item

1. Navigate to **Unit Control>Config>RF Out** and press Enter.
2. You are now ready to make a change to the RF Out sub-menu item.
3. Use the Navigation button UP and DOWN function to move up and down the choices for RF Out. (You only get On or Off)

4. Choose OFF or ON and press the Navigation button to accept.
5. Your green RF LED on the transmitter will turn off or on to match what you did.

Step 7: Make a Number Change to a Sub-Menu Item

1. Navigate to **Unit Control>RF>Freq** and press Enter.
2. You are now ready to make a number change to the Freq sub-menu item.
3. Use the Navigation button LEFT and RIGHT function to move the cursor block over any digit.
4. Use the Navigation button UP and DOWN function to increase or decrease the digit under the cursor block.
5. When done, press the Navigation button to accept the change.
6. For practice, set the frequency to a new value.

6. Advanced Operation – Field Controller Config Tool

6.1 Programming your Field Controller using the Field Controller Config Tool

Conditions

You're ready to get started programming your Field Controller with your Mission Commander software.

Remarks

Mission Commander Software comes with your Field Controller. (It's on the USB key). This software has some tools you can use with your Field Controller.

Before you Begin

You'll need:

- A Field Controller
- A CA0343 Field Controller USB cable
- A PC with Mission Commander Software loaded

Step 1: Connect the Field Controller to your PC

1. Connect the Lemo OB 6-way plug on the CA0343 cable to the right hand receptacle of the Field Controller.
2. Connect the USB plug on the CA0343 cable to your PC's USB port.
3. You'll see the display and one red LED illuminate on the Field Controller.

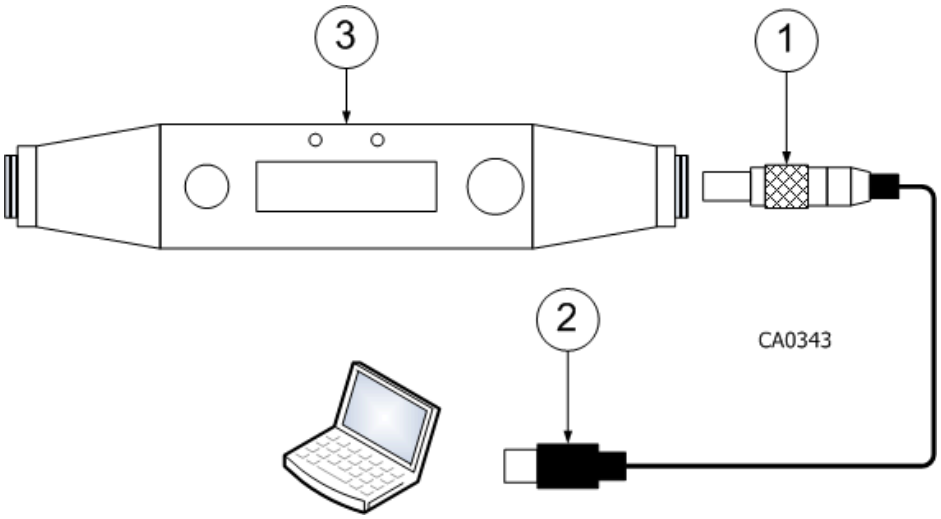


Figure 6-1 Connect the Field Controller to your PC

Step 4: Start Mission Commander

4. On your PC, double-click the Mission Commander icon. Mission Commander will start up at the Main Window.

Step 5: Open the Tools Pane

5. There's a cascading menu in the top left corner of Mission Commander. Click **Tools** and the pane on bottom left will list all the tools available to configure stuff. Three of them work with Field Commander.

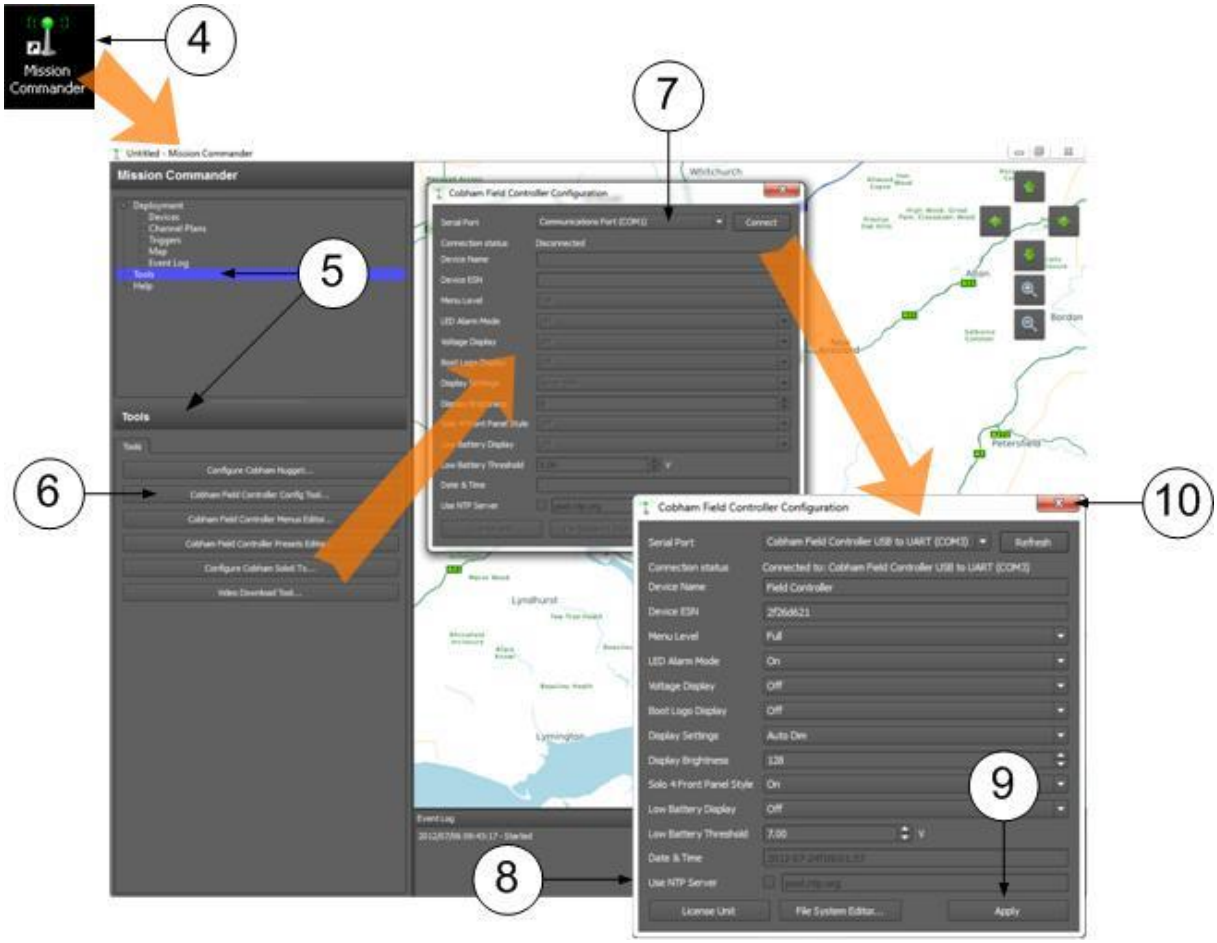
- Field Controller Config Tool
- Field Controller Menus Editor
- Field Controller Presets Editor

Step 6: Open the Field Controller Config Tool

6. Click the Field Controller Config Tool button. The Field Controller Configuration dialog will open.

Step 7: Set the Field Controller in the Serial Port Field

7. Open the Drop-down list and you should find something like:
8. **Field Controller USB to UART (Com3).**
9. Select this entry and click the **Connect** button.
10. Mission Commander is now hooked up to your Field Controller and will populate the dialog box with data.



Step 8: Configure the Field Controller

There are a whole bunch of things you can configure on your Field Controller so it works just the way you want. Have a look at this table.

Field	Sample Entries	Note
Device Name	Field Controller	Its call **Field Controller** by default. You can click on the field and call it anything you want. Put you name here to stop your colleagues from stealing it for example.
Device ESN	2f26d621	The Device Electronic Serial Number (ESN). It is hexadecimal and we may ask you for this during a support call. We use this number to control the licensing of your Field Controller. It is **not** the same as the serial number on the back of your Field Controller.
Menu Level	Full User Basic	You can choose which menu will be presented when the Field Controller starts up. We'll show you how to configure **what** will be in each of those menus later.
LED Alarm Mode	On Off	Those two LEDs above the display screen provide really useful information and we normally keep them switched on. When we're creeping about on a dark and stormy night we sometimes like to turn these off so we don't draw attention to ourselves.
Voltage Display	Off On	When set to on, the Field Controller will show you the **voltage** of the **unit** to which it is connected. You might have a transmitter with a bunch of batteries hidden away with just the cable showing. Plug in your Field Controller to get a quick look at the voltage of the covert installation. 
Boot Logo Display	Off On	When on, you'll see the big blue DTC word each time you power up your Field Controller. If that annoys you, select off.
Display Settings	Never Dim Auto Dim Auto Off	If you set Never Dim, the display brightness remains at the brightness you configured. Auto Dim makes it go dim after a few seconds without a key press. This saves power. Remember that the Field Controller steals power from whatever it is plugged into so this is important. Auto off makes the display switch off after a few seconds. The LEDs stay on. To get the display back up just move any button.

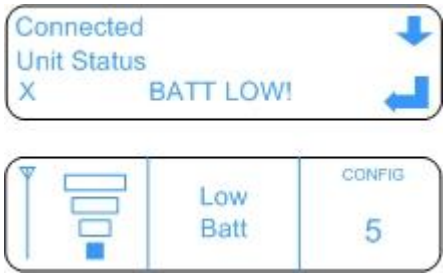
Field	Sample Entries	Note
		Auto off saves even more power.
Display Brightness	0 to 255	It's set at 128 by default which gives a comfortable brightness for a well-lit office. In full sunlight in Arizona you might want to wind it up to 255. At night in a dark and rainy Newcastle you'll probably choose about 50.
Solo 4 Front Panel Style	On Off	When off you'll see the normal Field Controller menu structures. When on, you'll see the Front Panel Emulation screen as the first item in the menu. Remember, the Field Controller must be licensed for front panel emulation to make this feature show up.
Low battery Display	On Off	When set to on, the Field Controller will show you a **Low Battery** warning for the **unit** to which it is connected. 
Low battery Threshold	0.00 to 12.00	Sets (in Volts) the level at which the Low Battery Display is triggered. If you set 7V and your SOLO5 TX is at 6.75V, the Low Battery display will come on. Every unit type will have a different voltage it considers to be a low battery condition. That's why we made it configurable.
Date & Time	2012-07-07T12:34:59	Normally greyed out. This is just here to display the current time on the Field Controller. It's for information only.
Use NTP Server	Unchecked Checked	When this is checked and you click the **Apply** button, your PC immediately checks the NTP server (if it has an internet connection) and downloads the current UTC time. Network Time Protocol (NTP) pool is a big virtual cluster of timeservers providing a reliable and easy to use service

Table 6-1 Configure the Field Controller Key

Step 9: Apply the Changes

Click the **Apply** button. You'll see a progress bar pop up as the Field Controller is loaded with the configuration.

Step 10: Click the Close Button

Top right corner of the dialog box, it's the little red button with a white X. Just click it to close.

Troubleshooting

☹ I never saw **Field Controller USB to UART (Com3)** listed in my Serial Port box.

☺ Check that you Field Controller is connected to the PC and the display and one red light is showing.

☹ The Field Controller is connected to the PC and showing displays and lights but still no **Field Controller USB to UART (Com3)** listed in my Serial Port box.

☺ The Field Controller needs a **driver** on the PC. The driver is on the USB key supplied with the Field Controller.

If you are running Windows XP, and you connect an unknown Field Controller, the PC will ask you for the driver.

If you are running Windows 7, the unknown Field Controller will appear in your **Device Manager** as an **Unknown Device** under **Other Devices**.

Right-click the Unknown device and click **Update Driver Software**.

6.2 Licensing your Field Controller

Conditions

You need a new feature on your Field Controller so you've contacted DTC and got the new licence. They sent you a *.lic file – now what?

Remarks

The Field Controller, like many DTC products, has lots of features but you only need to buy those you think you're going to use. We control what's available on the unit by the **licence** it carries.

If you need a **new** feature, you'll talk with your DTC representative and get the licence for that feature (a *.lic file) which will then be sent to you.

Before you Begin

You'll need:

- A Field Controller
- A CA0343 Field Controller USB cable
- A PC with Mission Commander Software loaded and a new licence on your PC desktop.

Step 1: Prepare to Program your Field Controller

In *Advanced Operations-Field Controller Config Tool*, *Programming your Field Controller using the Field Controller Config Tool*, perform the first **seven** steps. (It's the topic just above this one).

You'll now be looking at the Field Controller Configuration dialog.

Step 2: Click the License Button

When you click the License button the **Select License** window opens. Navigate to your licence file. It's a good idea to have it on your PC desktop to make it easy to find.

Step 3: Select the File

It will look something like: TT005613-2F26D621-61308.lic

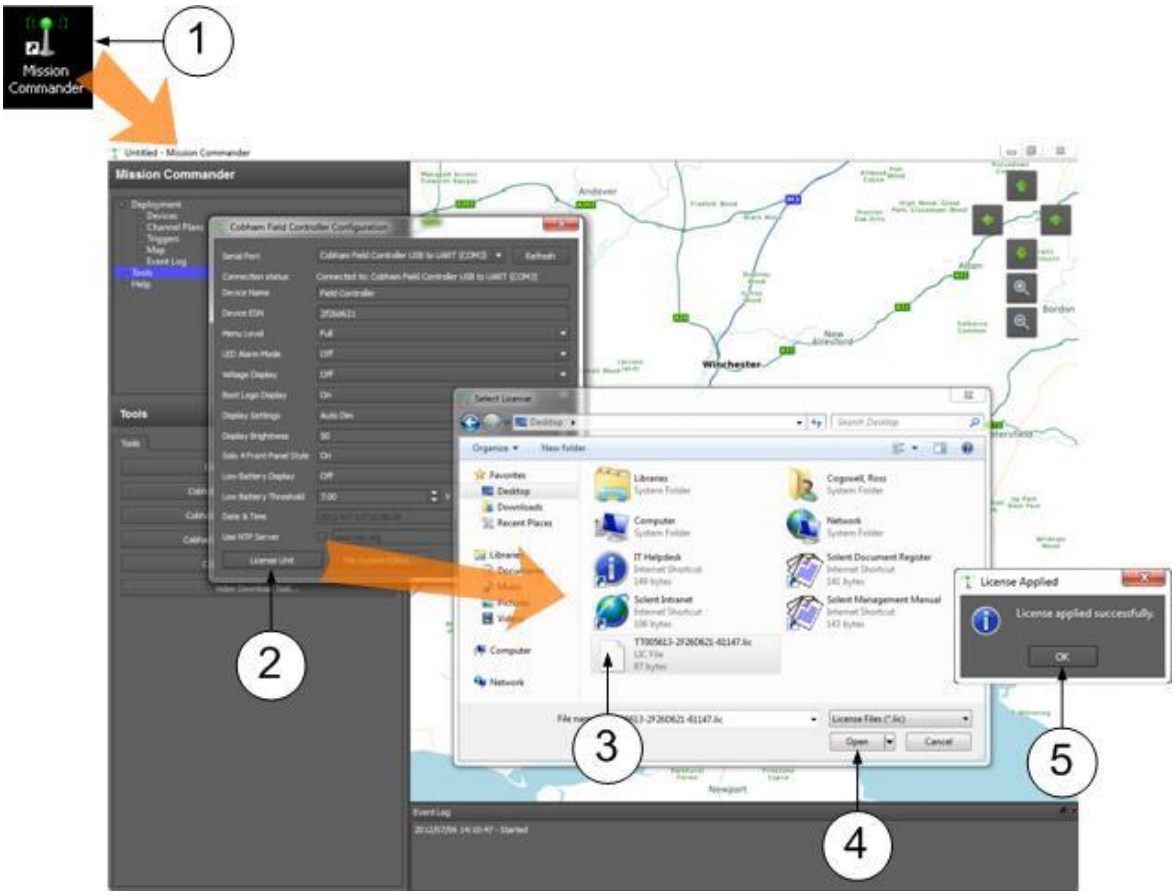
Step 4: Click the Open Button

When you click the **Open** button, the licence file will be loaded into your Field Controller and you'll get the message

License applied successfully.

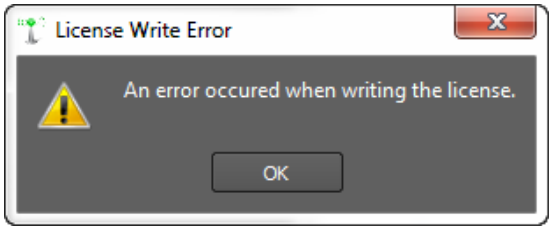
Step 5: Click the OK Button

You're all set and your new feature should be ready to switch on and explore.



Troubleshooting

☹ I saw this message:



☺ Do you have the correct licence file? The file name will look something like:

TT005613-2F26D621-61308.lic .

TT005613 is your D558 board number and **must** match the board in your enclosure.

2f26d621 is your Electronic Serial Number (ESN) and **must** match the one in your Field Controller. You can read the Field Controller's ESN in the **Local Settings>Serial** menu.

6.3 Deleting Menus with the File System Editor

Conditions

You want to cut down the menus available on your Field Controller. After all, you maybe don't have any SOLO4 Receivers, so why would you want a menu set for it?

Remarks

You have **Full**, **User** and **Basic** menu sets built in to your Field Controller which have been preset at the factory. There are menu sets for each product that Field Controller expects to encounter.

Let's remove a menu set.

Before you Begin

You'll need:

- A Field Controller
- A CA0343 Field Controller USB cable
- A PC with Mission Commander Software loaded.

Step 1: Prepare to Program your Field Controller

In *Advanced Operations-Field Controller Config Tool*, *Programming your Field Controller using the Field Controller Config Tool*, perform the first **seven** steps.

You'll now be looking at the Field Controller Configuration dialog.

Step 2: Click the File System Editor Button

When you click the File System Editor button the **Mission Commander** window opens.

Step 3: Cascade the Field Controller>Menus List

Click the little white plus symbol to cascade the menu open.

Step 4: Select the Item to Be Deleted

Click on an item in the list that you want to delete. It will highlight in blue when selected. Note that you can't select multiple items – you have to do them one at a time.

Step 5: Click the Delete Button

Be careful here, the moment you hit **Delete** it's gone – no second chances!

6.4 Deleting Macros with the File System Editor

Conditions

You saved a group of **macros** on your field Controller but no longer need them.

Remarks

You can create macros to use with your Field Controller to suit particular operations. However they soon start to clutter up your device.

Let's tidy up some of the mess.

Before you Begin

You'll need:

- A Field Controller
- A CA0343 Field Controller USB cable
- A PC with Mission Commander Software loaded.

Step 1: Prepare to Program your Field Controller

In *Advanced Operations-Field Controller Config Tool*, *Programming your Field Controller using the Field Controller Config Tool*, perform the first **seven** steps.

You'll now be looking at the Field Controller Configuration dialog.

Step 2: Click the File System Editor Button

When you click the File System Editor button the **Mission Commander** window opens.

Step 3: Cascade the Field Controller>Macros List

Click the little white plus symbol to cascade the menu open.

Step 4: Select the Item to Be Deleted

Click on an item in the list that you want to delete. It will highlight in blue when selected. Note that you can't select multiple items – you have to do them one at a time.

Step 5: Click the Delete Button

Be careful here, the moment you hit **Delete** it's gone – no second chances!

6.5 Formatting your Field Controller with the File System Editor

Conditions

You have a Field Controller that's just stuffed with menus, macros and who knows what else. You just want to start over with a nice clean system.

Remarks

It's easy to fill up your Field Controller with stuff. Sometimes it's good to get back to basics.

Before you Begin

You'll need:

- A Field Controller
- A CA0343 Field Controller USB cable
- A PC with Mission Commander Software loaded.

Step 1: Prepare to Program your Field Controller

In *Advanced Operations-Field Controller Config Tool*, *Programming your Field Controller using the Field Controller Config Tool*, perform the first **seven** steps.

You'll now be looking at the Field Controller Configuration dialog.

Step 2: Click the File System Editor Button

When you click the File System Editor button the **Mission Commander** window opens.

Step 3: Click the Format Button

Go on, just do it – there's one more step before oblivion. When you click the **Format** button the **Format the Field Controller** warning message come up.

Step 4: Click the Yes Button

Are you sure? Everything on the device will be deleted and lost forever...


1
Mission Commander
Mission Commander
Tools
Cobham Field Controller Configuration
MissionCommander
Format the Field Controller?
Are you sure? Everything on the device will be deleted and lost forever..
Yes
No
2
3
4

7. Advanced Operation – Field Controller Menus Editor

7.1 Configuring Field Controller Menus using the Field Controller Menus Editor

Conditions

You're ready to get started configuring your Field Controller menus using the **Field Controller Menus Editor** tool in Mission Commander.

Remarks

Mission Commander Software comes with your Field Controller. (It's on the USB key).

Most DTC products come with some Control software which enables you to set up all their parameters using a PC. Normally you'd do this task back at base well before the operation begins.

What happens if you have to change something on the unit when it has been deployed? You don't want to be dragging your laptop over the darkened rooftops to reprogram a SOLO5 Transmitter.

This is where you'd use the Control Menus on your Field Controller.

Your Field Controller will have a Basic, User and Full menus pre-installed at the factory with all the parameters we think you'll want to use.

Naturally, you'll want to configure the menus that way you want.

For example you may want some Field Controllers with everything enabled for the guys in the Technical Support Unit. For other units you deploy on the operation you may only want to enable RF Mode setting for SOLO4 Transmitters only.

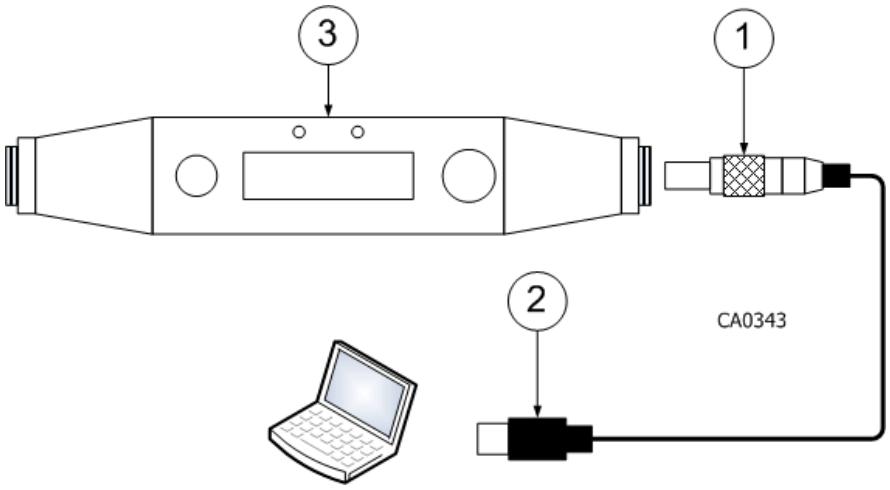
Before you Begin

You'll need:

- A Field Controller
- A CA0343 Field Controller USB cable
- A PC with Mission Commander Software loaded

Step 1: Connect the Field Controller to your PC

1. Connect the Lemo OB 6-way plug on the CA0343 cable to the right hand jack of the Field Controller.
2. Connect the USB plug on the CA0343 cable to your PC's USB port.
3. You'll see the display and one red LED illuminate on the Field Controller.



Step 4: Start Mission Commander

On your PC, double-click the Mission Commander icon. Mission Commander will start up at the Main Window.

Step 5: Open the Tools Pane

There's a cascading menu in the top left corner of Mission Commander. Click **Tools** and the pane on bottom left will list all the tools available to configure stuff. Three of them work with Field Commander.

- Field Controller Config Tool
- Field Controller Menus Editor
- Field Controller Presets Editor

Step 6: Open the Field Controller Menus Editor

Click the DTC Field Controller Menus Editor button. The Field Controller Menus Editor dialog will open.

Step 7: Select a Device you want to create a Menu for

On the top left corner of the dialog you'll see a pane labelled **Device:**

Scroll through the list to find your device. When you select an item, it will be highlighted in blue.

For this example, choose **DTC SOL04 Transmitter (SOL4TX).**

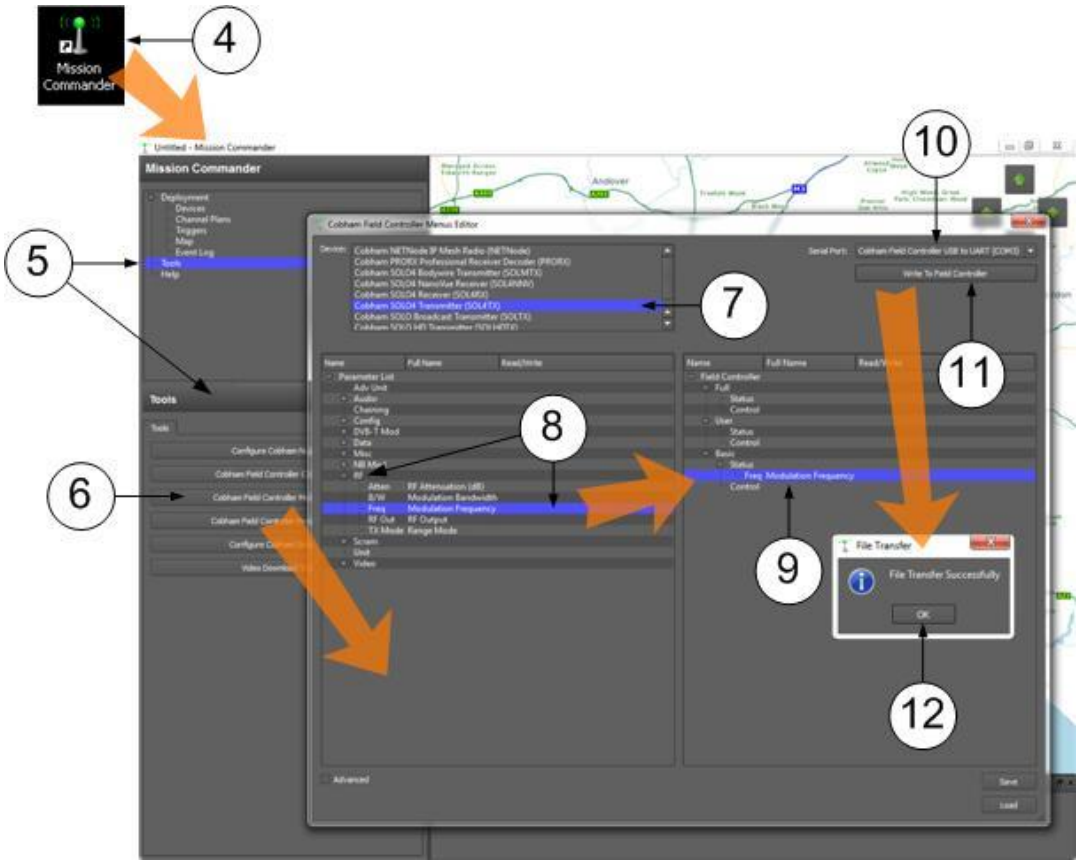
Step 8: Select an item from the Parameter List

The large left hand pane contains the **Parameter list**. Cascade the list by clicking on the + symbols. For this example, cascade the **RF** section and choose Modulation Frequency.

Step 9: Drag and Drop a Parameter to the Basic Status Menu

For this example, drag and drop the Modulation Frequency parameter to the **Basic>Status** menu in the right hand menu pane.

You'll see a little white + appear next to the **Basic>Status** menu. Cascade this open and you'll see Freq Modulation frequency has appeared in that menu.



Remarks

You have just created a very simple menu for your Field Controller. If you were to write this to your Field Controller then plug it into your SOLO4 Transmitter, you would only be able to do **one** thing. That would be to check the status of the Modulation Frequency using the **Unit Status** menu from the Basic set.

If you plugged your Field Controller into some other device type (like a NETNode for example), naturally you'd have an entirely different set of menus available to you.

You should be able to see now that for **any** DTC Product listed here, you can create a three level menu (Full, User and Basic) with just the parameters you want to see.

Remember, so far we have only moved one parameter into **Basic>Status**. Naturally, we would make up a complete set of menus for SOLO4 transmitter.

The items we drop into **Status** menus appear in **Unit Status** on the Field Controller. The items we drop into **Control** menus appear in **Unit Control** on the Field Controller.

When you are done building your menu you need to download it onto your Field Controller.

Step 10: Set the Field Controller in the Serial Port Field

Open the Drop-down list in the top right corner and you should find something like:

Field Controller USB to UART (Com3)

Select this entry. Note that your Com port may be different.

Step 11: Click the Write to Field Controller Button

You'll see the **File Transfer** Progress Bar, followed by the **File Transfer Successfully** messages.

Step 12: Click the OK Button

This will clear the **File Transfer Successfully** messages.

Troubleshooting

☹ I tried dragging a parameter over to one of the **Control** menus and it wouldn't let me!

☺ That's right, there's one more step when working with **Control Menus**. Try this example.

Step 1: Right-Click the Basic>Control Menu

You'll see the **Add Sub-menu** dialog. Click it.

Step 2: Type New Name for the Sub-Menu

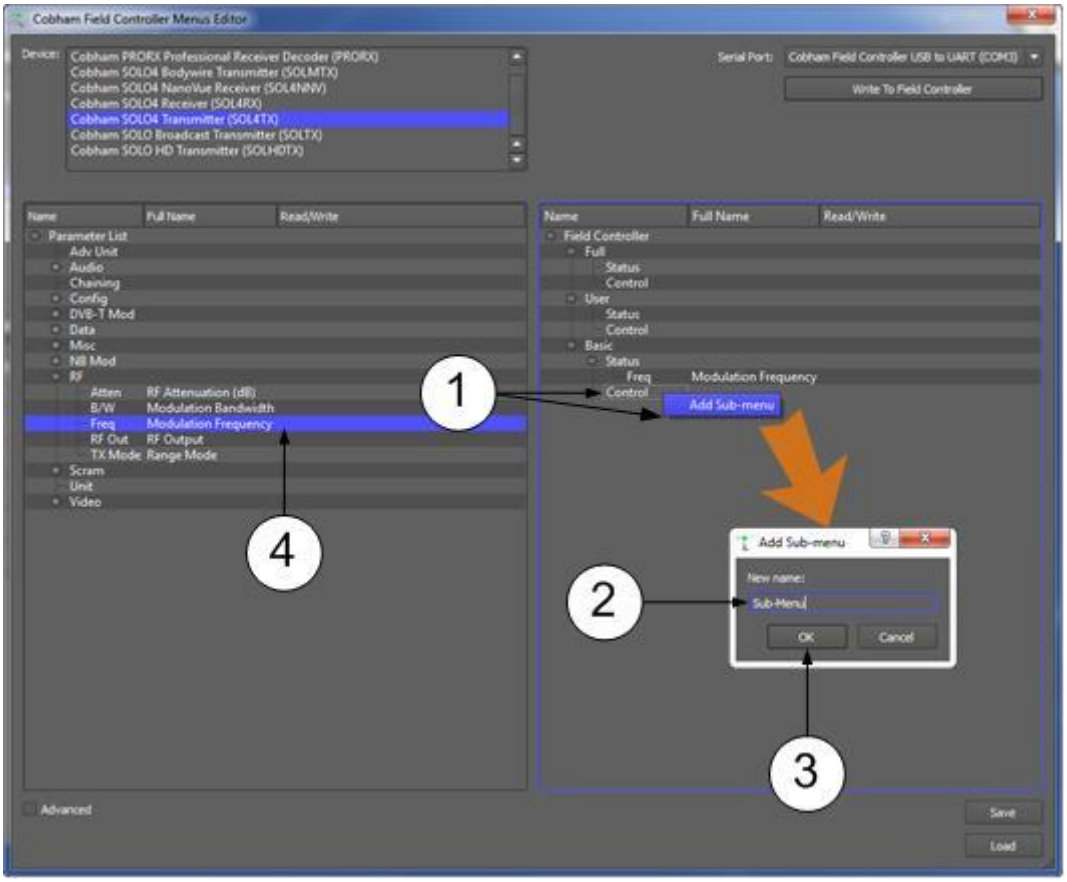
Replace the Sub-menu text with the name of the sub-menu you are creating. We recommend using the same name used in the parameter list to keep things tidy. Type **RF** for this example.

Step 3: Click OK Button

You'll see a little white + appear next to the **Basic>Control** menu. Cascade this open and you'll see your sub-menu has appeared in that menu.

Step 4: Drag and Drop a Parameter to your new Control Sub-Menu

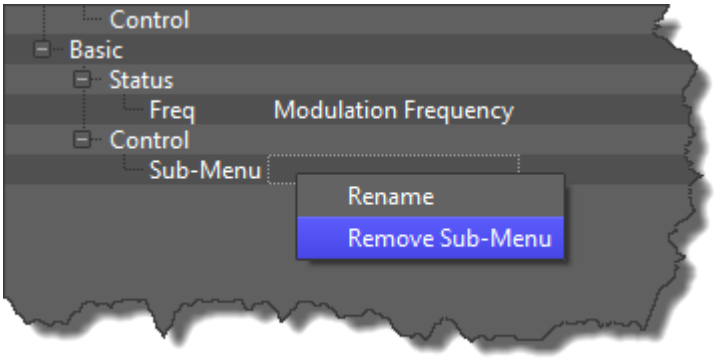
You'll find now that you can drag and drop in the normal way to the new sub-menu. Create as many sub-menus as you need to build the menu you want.



Troubleshooting

☹ I made a new sub-menu but typed the name wrong or built it in the wrong place.

☺ Just right-click the sub-menu and you'll see you can **rename** it or **delete** it.



8. Advanced Operation – Field Controller Presets Editor

8.1 Building Presets using the Field Controller Presets Editor

Conditions

You're ready to get started building and transferring **presets** using the **Field Controller Menus Editor** tool in Mission Commander and your Field Controller.

Remarks

Mission Commander Software comes with your Field Controller. (It's on the USB key).

Most DTC products come with some **Control software** which enables you to set up all their parameters using a PC. We normally set up these parameters and save them as **Configs** which we load into the radio.

Then, the guys on the ground only have to push the Config button a couple of times to set up the radio for the operation.

But, what if you want to change the Config in the Field? You don't want to be messing around with a laptop.

Also, what if you have ten radios to configure with really long and complicated AES256 keys? They all have to be exactly the same.

Here's where the Field Controller can really help.

You can use Mission Commander to carefully write out your configs then same them to the Field Controller. Now, take it out to the operation and you can load the new configs into as many units as you want and they'll all be a perfect copy of what you wrote on Mission Commander.

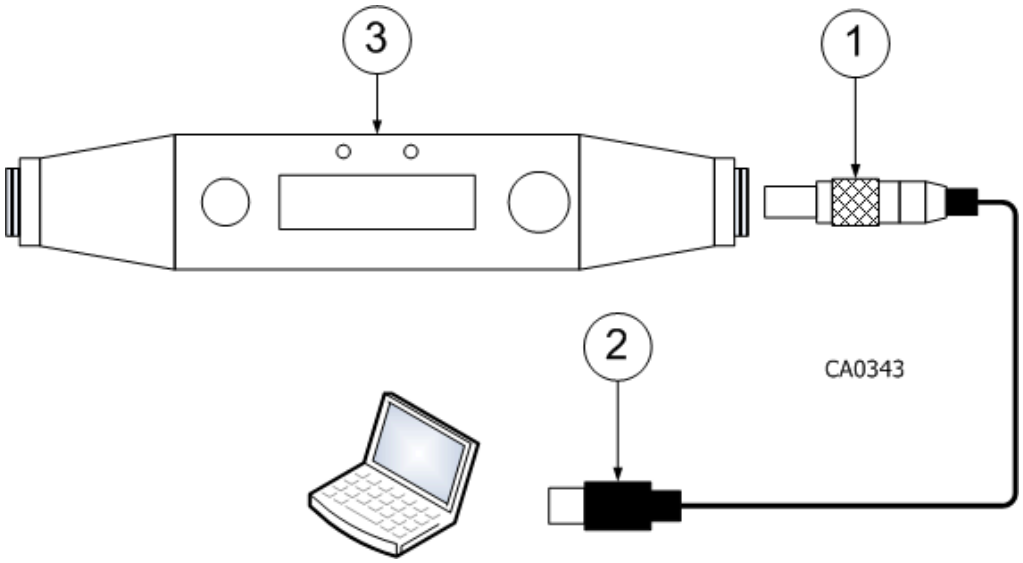
8.1.1 Before you Begin

You'll need:

- A Field Controller
- A CA0343 Field Controller USB cable
- A PC with Mission Commander Software loaded.

Step 1: Connect the Field Controller to your PC

1. Connect the Lemo OB 6-way plug on the CA0343 cable to the right hand jack of the Field Controller.
2. Connect the USB plug on the CA0343 cable to your PC's USB port.
3. You'll see the display and one red LED illuminate on the Field Controller.



Step 4: Start Mission Commander

On your PC, double-click the Mission Commander icon. Mission Commander will start up at the Main Window.

Step 5: Open the Tools Pane

There's a cascading menu in the top left corner of Mission Commander. Click **Tools** and the pane on bottom left will list all the tools available to configure stuff. Three of them work with Field Commander.

- Field Controller Config Tool
- Field Controller Menus Editor
- Field Controller Presets Editor

Step 6: Open the Field Controller Presets Generator

Click the Field Controller Presets Generator button. The Field Controller Presets Generator dialog will open.

Step 7: Select a Device you want to generate a Preset for

On the top left corner of the dialog you'll see a pane labelled **Device:**

Scroll through the list to find your device. When you select an item, it will be highlighted in blue.

For this example, choose **SOLO4 Transmitter (SOL4TX).**

Step 8: Select a Mode

Each device has a number of configurations where settings can be saved and loaded. The Presets Generator can program the Field Controller to download these configurations in one of two ways.

Write All Configs Mode - In this mode all of the configurations for the device are defined. The Field Controller then downloads all of the configurations to the device.

Note: the device will default to configuration 1 after the Field Controller has finished.

Write Single Config Mode - In this mode any number of configurations can be defined and loaded into the Field Controller. When the Field Controller is connected to a device, a single configuration is then selected and downloaded into the currently active configuration.

Note: for SOLO4 Transmitter, SOLO4 Bodywire Transmitter and the SOLO4 HD transmitter this will override the currently selected configuration.

Step 9: Configure Validity

This can be set to **Always** in most cases.

Sometimes however you want the config to only start being used from a particular date and end on a particular date too.

It may be that you are planning to use some frequencies that you only have a temporary licence for that begins next Wednesday and ends on Friday for example.

Alternately, you may be planning to use an AES key which management has decided must start next week but only last for two days before the keys expire.

Step 10: Set up your Configs

You'll find the parameters menu has already been cascaded.

Put a **checkmark** in the **Video source** checkbox (it will show a **grey** checkmark) and you'll see PAL come up under Config 1.

This means that PAL (the video line standard) will be inserted in every Config from one to eight.

This makes sense because you're likely to want the **same** line standard in **every** Config. In the USA we might set NTSC in every Config.

Now **double-click** the **Modulation Frequency** checkbox (it will show a white checkmark) and you'll see **separate** frequencies come up under **each** Config.

This means that separate frequencies will be inserted in each Config from one to eight.

This makes sense because you're likely to want different frequencies in **every** Config.

Double-click on each frequency and use the scroll arrows or directly type the frequency you want.

Step 11: Save your Configs

When you have written all your configs for your SOLO4 Transmitter we think it's a really good idea to save the file you have so carefully created.

1. Click the **Save** button in the bottom right hand corner.
2. The **Save Menus** dialog opens.
3. Type in a file name but be careful to leave the file type as *.fcp.
4. Click the **Save** button.
5. All you have done here is to save the configs to your PC. You have **not** loaded the Field Controller yet.
6. It's very valuable to have saved config sets like this because you may want to do the exact same deployment in a couple of weeks' time and the Field Controller might have been used for something else since.
7. In this case you'd simply click the **Load** button in the bottom right corner.
8. The **Load Menus** dialog opens.
9. Select a filename that ends with .fcp
10. Click the **Open** button.
11. Your **Field Controller Presets Generator** window will be populated with all your saved values which are then ready to be downloaded to your Field Controller.

Step 12: Give your Presets a Filename

Just type in a filename you want to use for the file going to the Field Controller.

Step 13: Type a Description for your File

This helps you to track your file and its purpose.

Step 14: Set the Field Controller in the Serial Port Field

Open the Drop-down list in the top right corner and you should find something like:

Field Controller USB to UART (Com3)

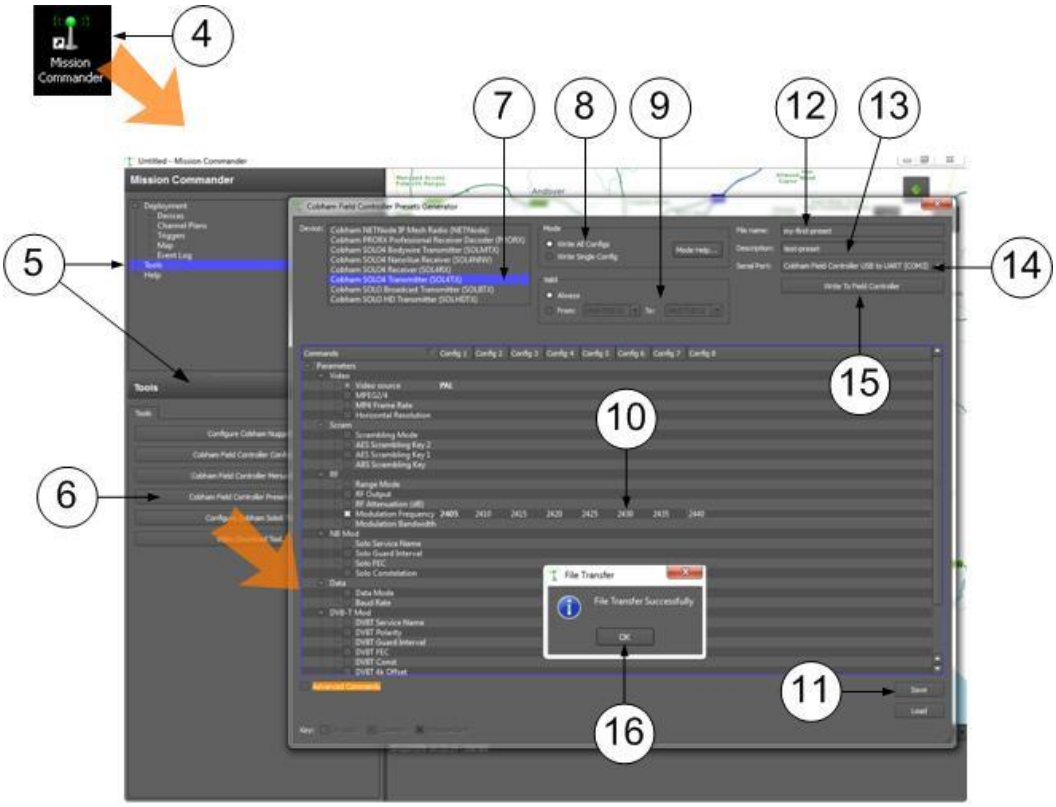
Select this entry. Note that your Com port may be different.

Step 15: Click the Write to Field Controller Button

You'll see the **File Transfer** Progress Bar, followed by the **File Transfer Successfully** messages.

Step 16: Click the OK Button

This will clear the **File Transfer Successfully** messages.



Troubleshooting

☹ I'm sure my device is supposed to have 16 Presets.

☺ That's possible. Try clicking **SOLO4 Bodywire Transmitter (SOLMTX)** in the **Device** pane at the top left of the **Presets Generator** window and you'll see 16 Config tabs come up.

☹ I want to build a Preset for a NETNode, not a SOLO4 Transmitter.

☺ You can build a Preset for **any** device listed in the **Device** pane. NETNode IP Mesh Radio (NETNode) is at the top of the list. Notice that when you select it, the Parameters in the main pane change to reflect the different device.

8.2 Loading Presets into a Unit using the Field Controller

Conditions

You've carefully constructed and written a Preset into your Field Controller using the Presets Generator tool in Mission Commander. Now, you are ready to upload these presets to a unit like a SOLO4 Transmitter.

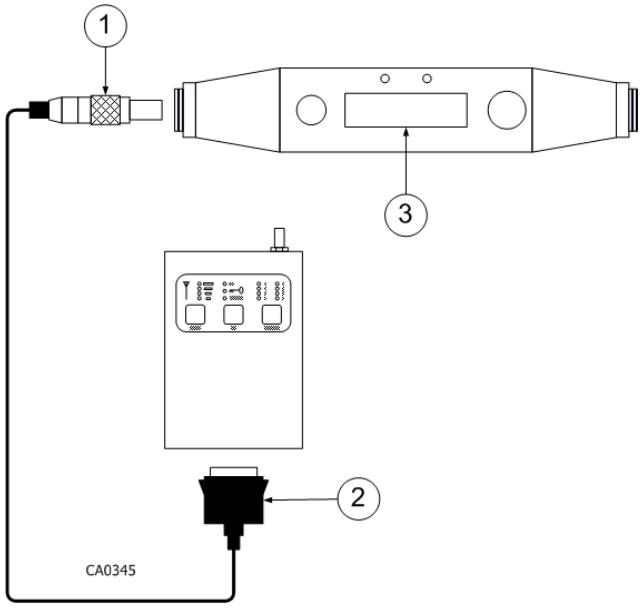
Before you Begin

You'll need:

- A powered SOLO4 Transmitter
- A CA0345 D510 Field Controller Control Cable
- A Field Controller that has a preset loaded from Mission Commander

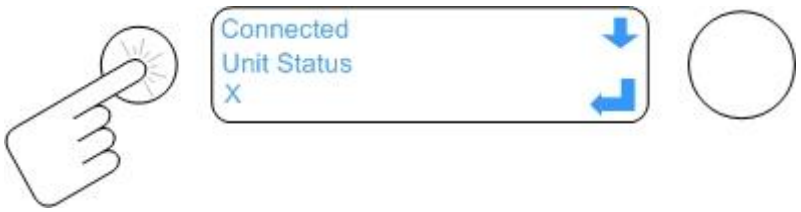
Step 1: Connect the Field Controller to your Device

1. Connect the Lemo OB 5-way plug on the CA0345 cable to the left hand jack of the Field Controller.
2. Connect the Hirose plug on the CA0345 cable to your SOLO4 transmitter's Hirose port.
3. The display should be on; the left LED should be green telling us we are successfully connected to the unit. The right LED could be red or green depending on the alarm state of the unit – it doesn't matter.



Step 2: Get Back to Home

Press the **Cancel** button until you see something like this:



Step 3: Navigate to the Cfg Upload Menu

Use the Navigation button UP and DOWN function to move up and down the menu tree until you find the **Cfg Upload** menu.

Step 6: Enter the Cfg Upload Menu Structure

Press the **Navigation** button once to enter the **Cfg Upload** sub-menu. You'll see the word **Searching**... and then, something like this:

This tells us that the **current** preset available for loading is called **Test**.

Note: This is the name you typed in the **Description** field on Mission Commander. (**Not** the **File name** field).

The display also tells us there are three possible presets available for this unit to download.

Step 7: Scroll through the Presets

Use the Navigation button UP and DOWN function to move up and down the available presets until you find the one you want to load.

Step 8: Enter the Send page

Press the **Navigation** button once to enter the **Send** page. You'll see the display change to this:

Step 9: Scroll to Send

Use the Navigation button DOWN function to move down to the **Send** Command.

Step 10: Send the Preset to the Unit

Press the **Navigation** button once to send the file to the unit. You'll see the message Please Wait... and then a progress bar will appear.

Finally, you'll see the message **Done!**

This tells you the upload was successful.

Troubleshooting

☹ When I did **Step 6 – Enter the Cfg Upload Menu Structure**, the Field Controller said "No Cfgs Found". Why?

☺ This means there are no configurations available for the **unit you are plugged into**.

Let's say you build a bunch of SOLO4 Transmitter configs and download them to your Field Controller. Now you plug your Field Controller into a **SOLO5** transmitter, you'll see the message "No Cfgs Found".

Every time a Field Controller is plugged into a unit it asks the question "what are you". If the unit is able to reply (comms and protocol are good), it will say "I am a SOLO5".

Now the Field Controller will use SOLO5 menus and offer SOLO5 Config files etc.

☹ When I scroll through my Field Controller Menu, I don't have Cfg Upload.

☺ Your Field Controller is not licensed for this feature. See *Level Three - Field Controller Config tool*. You can learn all about licensing there.

9. Appendix A – Cautions and Warnings

9.1 Cautions and Warnings

Serial	Area	Note
1	Enclosures	Do not remove any factory installed screws or fastenings. Damage to the units may result and void any warranties. Only authorised, trained personnel should open the product. There are no functions that required the user to gain access to the interior of the product. There are no user serviceable parts inside.
2	Maintenance	Other than cleaning, no scheduled maintenance is required to ensure proper function of the unit.
3	Environment	The equipment should not be used in hazardous or corrosive atmospheres. Users are reminded of the necessity of complying with restrictions regarding the use of radio devices in fuel depots, chemical plants and locations where explosives are stored and/or used.
4	Power Supply	Ensure that the power supply arrangements are adequate to meet the stated requirements of each product. Observe all electrical safety precautions.
5	Electro Static Discharge (ESD) Precautions	ESD guidelines must be followed for this electrostatic sensitive device.
6	Lightning Strike	There is a risk of lightning strike to antennas. The equipment should not be assembled in an area at the time of lightning activity. Antennas should be adequately protected from lightning strikes.
7	Working at Height	Observe caution when locating the device at height, for example on a mast. Ensure the unit is well secured to prevent it falling and injuring personnel.
8	Risk of Eye Injury	Care should be taken to avoid eye contact with the antennas.
9	Cables	Connecting cables should not be positioned where they are likely to become damaged or where they may present a trip hazard.
10	Thermal Control System	Any powered device will always produce heat as a by product of its operation. If you operate this device in an enclosed space you must ensure it has adequate airflow to keep it cool. Also, if worn close to the body, care must be taken to protect the operator from excessive temperatures.
11	RF Emission System	When using this device please ensure a distance of 20cm is maintained between your device and your body while the device is transmitting.
12	Aircraft Safety	Use of this equipment on board aircraft is strictly forbidden. Use of radio transmitter equipment in an aircraft can endanger navigation and other systems.

Table 9-1 Cautions and Warnings

9.2 EMC/Safety and Radio Approvals

The equipment has been designed to meet and has been tested against the following harmonized EMC and safety standards:

9.3 CE Marking

The CE mark is affixed to all Field Controller products, and the CE Declaration of Conformity, as well as the technical file is available on request.

10. Appendix B – Care and Maintenance

10.1 Caring for your Equipment

- Do not subject the unit to physical abuse, excessive shock or vibration
- Do not drop, jar or throw the unit
- Do not carry the unit by the antenna
- Avoid exposure to excessive moisture or liquids
- Do not submerse the unit unless it is designed to be submersible
- Do not expose the unit to corrosives, solvents, cleaners or mineral spirits
- Avoid exposure to excessive cold and heat
- Avoid prolonged exposure to direct sunlight
- Do not place or leave units on surfaces that are unstable
- Always turn the unit off before installing optional accessories
- Only use accessories intended for the specific make and model of your unit, especially batteries, chargers and power adapters

10.2 Charging

- Use approved batteries, chargers and adapters designed specifically for your make and model unit
- Do not attempt to charge a wet unit or battery pack
- Do not charge the unit or battery pack near anything flammable
- Stabilize the battery pack to room temperature (72 degrees F) before charging
- Do not charge units and/or battery packs on wet or unstable surfaces
- Do not leave units and/or batteries in chargers for excessive periods

10.3 Working with Lithium Batteries

- Charge only with the approved charging cable
- Batteries are to be used only for the specified purpose. Incorrect use will invalidate the warranty and may make the battery become dangerous
- Charge in a clean, dry environment, ideally at 10°C. (0 to 45°C is permissible)
- Do not store or operate in direct sunlight for extended periods. Battery can be damaged by over-heating, for example if placed on the rear parcel shelf of a motor vehicle
- Store in a cool dry environment. Storage at elevated temperatures can cause permanent loss of capacity
- For short term (less than six months) storage, store in a fully charged state.
- For extended periods of storage (more than one year) charge before storage and recharge every six to nine months
- Always fully recharge the battery after any storage period greater than one month before use
- Do not store the battery with the charge depleted as this can cause failure of the battery and invalidate warranty

- Do not short circuit
- Do not immerse in water
- Do not incinerate. Cells are likely to explode if placed in a fire
- Dispose of batteries in accordance with the regulations in place for the Country of use. Batteries are normally considered 'separate waste' and should not be allowed to enter the normal waste stream. Either return to the seller, or deliver to an approved re-cycling facility

10.4 Cleaning

- Turn off the unit and remove batteries (if applicable) before maintenance
- Use a clean, soft, damp cloth to clean the unit. A microfiber cloth is recommended
- Do not use alcohol or cleaning solutions to clean the unit
- Do not immerse the unit in water to clean it
- If the unit becomes wet, immediately dry it with a microfiber or other lint-free cloth

10.5 Storage

- Turn off the unit and remove batteries before storage
- Store units and battery packs in a cool, dry area at room temperature (72°F)
- Do not store units and/or batteries in active chargers

10.6 Repairs

Do not attempt any repair. The unit contains no user serviceable parts. Contact the DTC Customer Service Centre.

10.7 Getting Technical Support

Contact Client Services

Technical support enquiries should be sent to the Client Services team.

Post: DTC – Solent, Fusion 2, 1100 Parkway, Solent Business Park, Whiteley, Hampshire, PO15 7AB, England.

Phone: +44 1489 566 750 then press 1 for support. Office hours: 0900-1700 UK time excluding holidays.

Email: solent.support@domotactical.com (no restricted content).

For technical support we undertake to get a first response to you in less than one working day and a progress update at least every two weeks.

Documentation

It is DTC's practice to make the majority of our latest manuals and user guides available to customers online, by using our WatchDox facility. To access this site please contact your Account Manager or send a request to solent.support@domotactical.com

You will then be sent a link where you can login and create your own password. You will then receive a confirmation email. Once you have done this you will then be able log into your account.

10.8 Using the DTC RMA Service

You have a problem and all troubleshooting steps have been unsuccessful. You need to contact DTC for Return Material Authorisation (RMA) Service.

Step 1: Email DTC

To return something to Solent please Email solent.rma@domotactical.com. We will then send you an RMA request form to complete and return. We'll then send you an RMA number and shipping instructions.

Step 2: Save your Personal Kit

Remove all personal kit or media from the device.

Step 3: Pack the Unit

Use the original shipping container and packing materials if possible.

If the original packing materials are not available, wrap the equipment with soft material (e.g. PU/PE form) then put the wrapped equipment into a hard cardboard shipping box.

Step 4: Prepare an Information Sheet

Include a sheet with the following information.

Note: Please keep a copy of this sheet for your records.

- Name
- Address
- Unit Serial Number
- Date of Purchase or the original invoice number
- Date of failure
- A detailed description of the problems you have encountered
- A list of the hardware/software configuration if applicable

Step 5: Put the RMA Number on the Box

Clearly mark the outside of the shipping box with the RMA number. If an RMA number is not present on the shipping box, receiving will be unable to identify it and it might be returned.

Step 6: Send the Box to DTC

Send the box using your normal shipping process.

11. Appendix C – Glossary

11.1 Glossary

0-9	Means…
16QAM	16-state Quadrature Amplitude Modulation.
64QAM	64-state Quadrature Amplitude Modulation.

A	Means…
AC	**Alternating Current.** Current that is continually changing in magnitude and periodically in direction from a zero reference level.
A/V	Audio/Video.
AES	In cryptography, the **Advanced Encryption Standard** (**AES**) is an encryption standard adopted by the U.S. government. The standard comprises three block ciphers, AES-128, AES-192 and AES-256, adopted from a larger collection originally published as **Rijndael.** Each AES cipher has a 128-bit block size, with key sizes of 128, 192 and 256 bits, respectively.
ASI	**Asynchronous Serial Interface**. A streaming data interface which often carries an MPEG Transport Stream. An ASI signal can carry one or multiple SD, HD or audio programs that are already compressed, not like an uncompressed SD-SDI (270Mbs) or HD-SDI (1.45Gbs). An ASI signal can carry varying amounts of data but is always padded to run at a fixed line rate of 270 Mb/s.
Amplification	The process of increasing the strength (current, voltage or power) of a signal.
Amplitude	The level of an audio or other signal in voltage or current. The magnitude of variation in a changing quantity from its zero value.
Amplitude Modulation	Modulation in which the amplitude of the carrier wave is varied above and below its normal value in accordance with the intelligence of the signal being transmitted. Also called AM.
Analogue	**Analog transmission** is a transmission method of conveying voice, data, image, signal or video information using a continuous signal which varies in amplitude, phase, or some other property in proportion to that of a variable.
Antenna	An **antenna** (or **aerial**) is a transducer designed to radiate or receive electromagnetic energy (generally RF).
Antenna Bandwidth	The frequency range over which a given antenna will accept signals.
Antenna Gain	The effectiveness of a directional antenna as compared to a standard non-directional antenna. It is usually expressed as the ratio in decibels of standard antenna input power to directional antenna input power that will produce the same field strength in the desired direction. For a receiving antenna, the ratio of signal power values produced at the receiver input terminals is used. The more directional an antenna is, the higher is its gain.

A	Means…
Attenuation	Power loss resulting from conductor resistance and dielectric loss within the insulating material used to separate the conductors.

B	Means…
BNC	**Bayonet Neill-Concelman** – A very common type of RF connector used for terminating coaxial cable.
Bandwidth	The width of a band of frequencies used for a particular purpose.

C	Means…
COFDM	**Coded Orthogonal Frequency Division Multiplexing** is a frequency-division multiplexing (FDM) scheme utilized as a digital multi-carrier modulation method. A large number of closely-spaced orthogonal sub-carriers are used to carry data.

D	Means…
D/C	Downconverter. A device which converts microwave frequencies to UHF frequencies for use in DTC receivers.
Digital	A **digital signal** is a discontinuous signal that changes from one state to another in discrete steps.
Decibel	The standard unit used to express transmission gain or loss and relative power levels. Also written as dB.
Decoder	Processor in a video receiver that converts digital video data to analogue signals for replay on analogue monitors; or in certain cases a software decoder, a program that decodes digital data for replay on the PC (decompression etc).
Demodulate	To recover the information originally impressed on the radio wave.

E	Means…
Electromagnetic field	The field of force that an electrical current produces around the conductor through which it flows.
Electromagnetic Waves	A wave propagating as a periodic disturbance of the electric and magnetic fields and having frequency in the electromagnetic spectrum; the means by which energy is transmitted from one place to another.
Elementary Stream (ES)	Elementary streams: These streams contain only one MPEG-2 video channel and no audio. Elementary streams are required if you intend to use **Milestone** or any player that cannot operate with Transport streams. You must be in RTSP mode to use Elementary streams.

E	Means…
Encoder	A processor in a video transmitter which converts analogue video from a camera to digital data.

F	Means…
FEC	**Forward Error Correction** is a system of error control for data transmission, whereby the sender adds redundant data to its messages, also known as an **error-correction code**. This allows the receiver to detect and correct errors (within some bound) without the need to ask the sender for additional data. The advantage of forward error correction is that a back-channel is not required, or that retransmission of data can often be avoided, at the cost of higher bandwidth requirements on average. FEC is therefore applied in situations where retransmissions are relatively costly or impossible.
Firmware	Software which is installed directly on a device and is intended specifically for that device and is used to control it.
FOV	**Field of View -** The field of view (also field of vision) is the angular extent of the observable world that is seen at any given moment.
Fading	A periodic decrease in received signal strength
Frequency	The rate at which a process repeats itself. In radio communications, frequency is expressed in cycles per second. Signals also have a property called wavelength, which is inversely proportional to the frequency.
Frequency Modulation	The process of varying the frequency of a carrier wave, usually with an audio frequency, in order to convey intelligence. Also called **FM**.
FPGA	**Field-Programmable Gate Array -** an integrated circuit designed to be configured by the customer or designer after manufacturing, hence "field-programmable".

G	Means…
GUI	**Graphical User Interface.**
GHz	**Gigahertz** - One gigahertz is equal to 1,000 megahertz (MHz) or 1,000,000,000 Hz.
Gain	The increase in signal strength that is produced by an amplifier.

H	Means…
Hertz	One cycle per second.

I	Means…
IP Address	**Internet Protocol Address** – A unique numeric ID for a device within a network.
IR	**Infra Red** - Infrared (IR) radiation is electromagnetic radiation whose wavelength is longer than that of visible light.
Impedance	The total opposition offered by a circuit or component to the flow of alternating current.

L	Means…
LOS and NLOS	**Line-of-sight** propagation refers to electro-magnetic radiation including light emissions travelling in a straight line. The rays or waves are diffracted, refracted, reflected, or absorbed by atmosphere and obstructions with material and generally cannot travel over the horizon or behind obstacles. NLOS is Non Line-of-sight.
Load	A device that consumes electrical power.
Lux	The **lux** (symbol: **lx**) is the SI unit of illuminance and luminous emittance. It is used in photometry as a measure of the *apparent* intensity of light hitting or passing through a surface.

M	Means…
MHz	**Megahertz** is equal to 1,000,000 Hz
mW	**Milliwatt** - The milliwatt (symbol: mW) is equal to one thousandth (10^{-3}) of a watt.
MPEG	Moving Pictures Experts Group.
Modulation	To change the output of a transmitter in amplitude, phase or frequency in accordance with the information to be transmitted. Data is superimposed on a carrier current or wave by means of a process called modulation. Signal modulation can be done in either of two main ways: analogue and digital. In recent years, digital modulation has been getting more common, while analogue modulation methods have been used less and less. There are still plenty of analogue signals around, however, and they will probably never become totally extinct.
Multicast	Multicasting is sending data from a sender to multiple receivers where each receiver signals that they *want* to receive the data.

N	Means…
nm	A **nanometre** (American spelling: **nanometer**; symbol **nm**) is a unit of length in the metric system, equal to one billionth of a metre (i.e., 10^{-9} m or one millionth of a millimetre).

N	Means…
NMEA 0183	**NMEA 0183** is a combined electrical and data specification for communication between marine electronic devices such as echo sounder, sonar, anemometer, gyrocompass, autopilot, GPS receivers and many other types of instruments. It has been defined by, and is controlled by, the U.S.-based National Marine Electronics Association.
NTSC	National Television Systems Committee.
Noise	Random pulses of electromagnetic energy generated by lightening or electrical equipment.

O	Means…
Omni directional antenna	An antenna whose radiation pattern shows equal radiation in all horizontal directions.
Oscillation	A periodic, repetitive motion or set of values (voltage, current, velocity).

P	Means…
PAL	Phase Alternate Line.
PIR	**Passive Infra Red** sensor (PIR sensor) is an electronic device that measures infrared (IR) light radiating from objects in its field of view.
PTZ	**Pan, Tilt and Zoom** – PTZ is a common way of referring to controllable cameras.
Propagation	A phenomenon by which any wave moves from one point to another; the travel of electromagnetic waves through space or along a transmission line.

Q	Means…
QPSK	Quadrature Phase Shift Keying.

R	Means…
RF	**Radio Frequency.**
RTSP	**Real Time Streaming Protocol** (RTSP) is a network control protocol designed for use in entertainment and communications systems to control streaming media servers. The protocol is used for establishing and controlling media sessions between end points. Clients of media servers issue VCR-like commands, such as play and pause, to facilitate real-time control of playback of media files from the server.
Rx	**Receiver**, an electronic device that changes a radio signal from a transmitter into useful information.

R	Means…
Radiate	To transmit RF energy.
Radio Frequency	Any frequency of electrical energy capable of propagation into space (usually above 20kHz). Also called RF.

S	Means…
SNR	**Signal to Noise Ratio** is an electrical engineering measurement defined as the ratio of a signal power to the noise power corrupting the signal. Signal-to-noise ratio compares the level of a desired signal (such as music) to the level of background noise. The higher the ratio, the less obtrusive the background noise is.
Shannon Limit	The **Shannon limit** or **Shannon capacity** of a communications channel is the theoretical maximum information transfer rate of the channel, for a particular noise level.
Signal	In electronics, a signal is an electric current or electromagnetic field used to convey data from one place to another. The simplest form of signal is a direct current (DC) that is switched on and off; this is the principle by which the early telegraph worked. More complex signals consist of an alternating-current (AC) or electromagnetic carrier that contains one or more data streams.
Streaming	**Streaming** is the transmission of digital audio or video or the listening and viewing of such data without first storing it.

T	Means…
Tx	A **transmitter** is an electronic device which, usually with the aid of an antenna, propagates an electromagnetic signal such as radio, television, or other telecommunications.
TNC	The **TNC (threaded Neill-Concelman) connector** is a threaded version of the BNC connector. The connector has a 50 Ωmpedance and operates best in the 0–11 GHz frequency spectrum.
Transport Stream (TS)	Transport streams: These streams can contain several MPEG-2 content channels and associated audio. All the channels are multiplexed together, allowing the receiver to choose which to play back.

U	Means…
UDP	**User Datagram Protocol** (UDP) Sometimes called fire and forget because there is no dialog between the sender and receiver. If the receiver does not get a packet, the sender will never know. However, UDP is very efficient when there is little chance of errors (like in your LAN), or when TCP would provide "too late" delivery.
USB	Universal Serial Bus

U	Means…
UVMS	**Universal Video Management System**, a network video recorder storage solution from BAE Systems. Provides comprehensive archiving coupled with live and retrospective viewing.
Unicast	Unicast is simply sending packets from one source to one destination. For example, from one web server to one (or each) person viewing a page on a web browser.

V	Means…
VHF	**Very High Frequency** – 30 MHz to 300 MHz
V	Volt.
Viterbi Decoder	A Viterbi decoder uses the Viterbi algorithm for decoding a bit stream that has been encoded using forward error correction based on a Convolutional code.

W	Means…
Watt	The **watt** (symbol: **W**) is a derived unit of power in the International System of Units (SI). It measures rate of energy conversion. One watt is equivalent to 1 joule (J) of energy per second.
Waveform	Signal shape.
Waveguide	A specially formed hollow metal tube, usually rectangular in shape in cross section, used to connect a High Power amplifier to the antenna.

12. Appendix D – Reference Material

12.1 Firmware Updates

The Field Controller has field upgradable internal firmware. To upgrade the firmware you will need a PC with a USB port, a terminal application such as Tera Term and the download file from DTC.

The download file will be named 'D588_vX.X.all' where X.X is the version number.

Save the file to the hard disc of the PC.

Step 1: Determine the COM port.

The COM port being used by the Field Controller can be found at the top of the Field Controller control application OR can be found using the Windows Device Manager.

1. Plug the Field Controller into a USB port.
2. Click the Windows **Start** button.
3. Click **Run.**
4. Enter **Device Manager** and click **OK.**
5. Select **Ports (COM & LPT).**
6. Locate **Field Controller USB to UART.**
7. The COM port is shown in brackets.

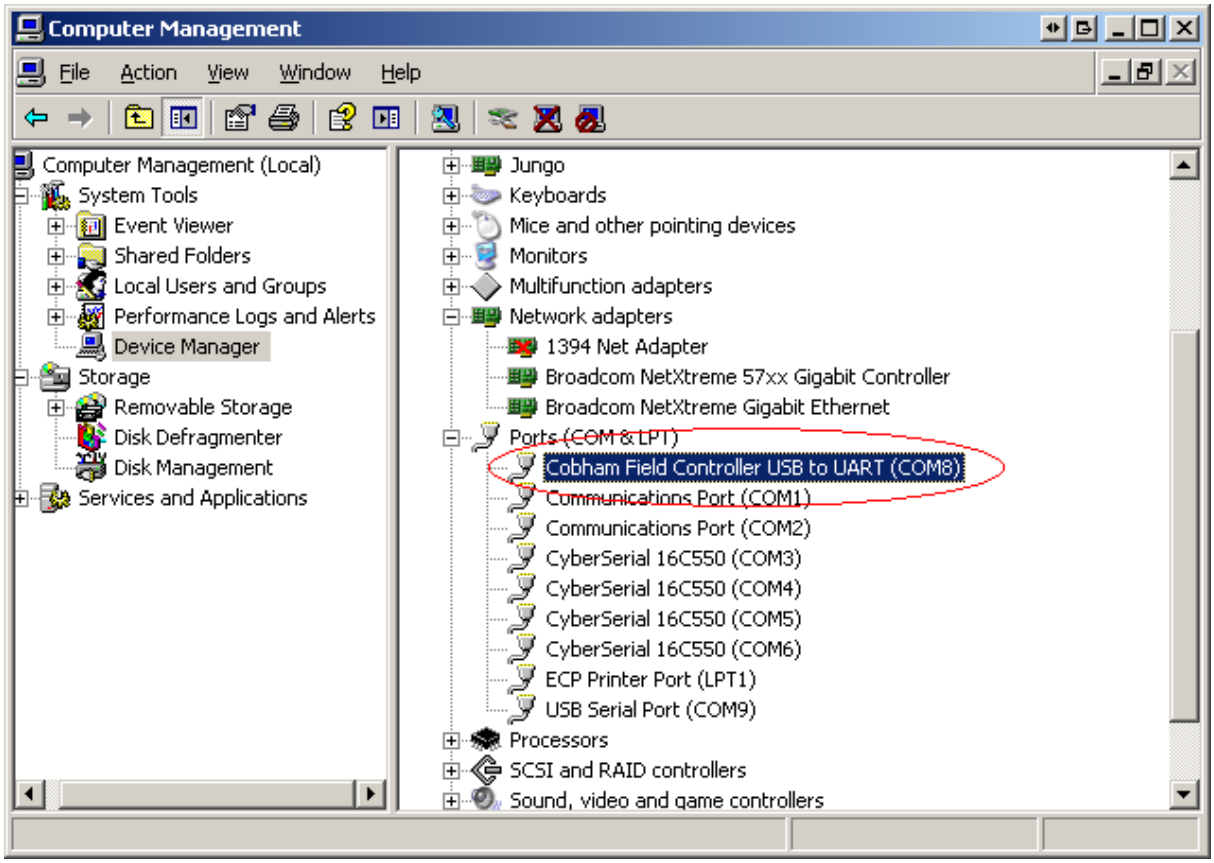


Figure 12-1 Windows Device Manager

Step 2: Updating the Firmware

Note: Do not start the terminal application (eg Tera Term) until told to do so in the instructions.

1. Unplug the Field Controller from the PC USB port.
2. Press and hold the Enter Key.
3. Plug the Field Controller into the PC USB port.
4. The Field Controller Display will show:

Figure 12-2 Field Controller Bootloader

5. Release the Enter Key.
6. Push the navigation button **UP.**
7. The Field Controller Display will show:

Figure 12-3 Field Controller Erasing Flash

8. After a few seconds the display will show:

Figure 12-4 Field Controller Ready for Download

9. Start Tera Term.
10. Select **Setup>Serial Port**.
11. Select the COM port for the Field Controller established from Device Manager.
12. Set the serial port for 115200 baud, 8 data bits, 1 stop bit and no parity.
13. Click **OK** to close the dialogue box.

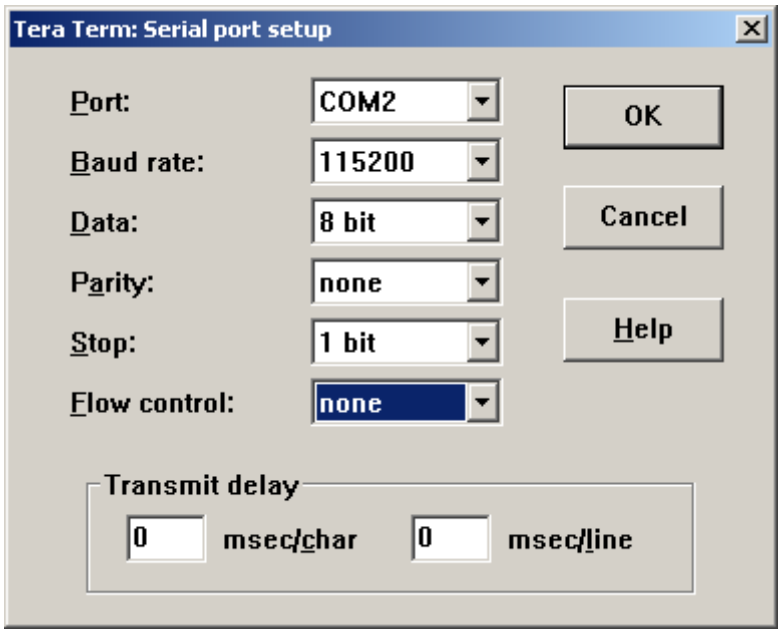


Figure 12-5 Serial Port Settings

14. Select **File>Send file.**
15. Select the **.All(*.*)** Files of type.
16. Ensure the **Binary** option is ticked.
17. Change **Look in** to the location of the upgrade file and select the file.
18. Click **Open.**

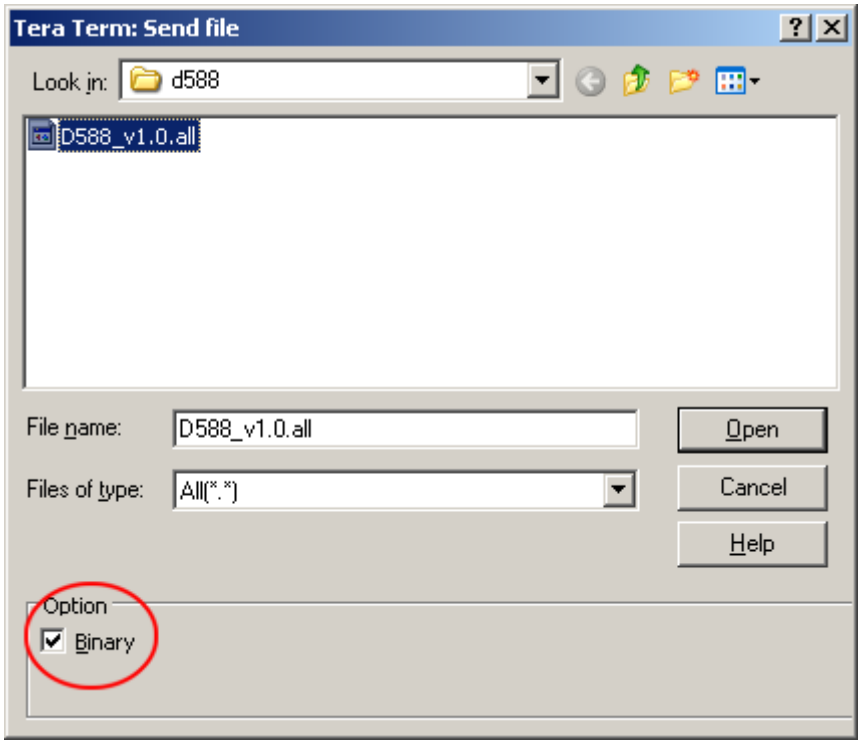


Figure 12-6 Send File options

19. While the file is downloading you must not unplug the Field Controller from the PC
20. After the file has downloaded the display will show:

Figure 12-7 Field Controller Verifying

21. After a few seconds the Field Controller will restart, the software download is complete.
22. Finally close Tera Term on the PC.
23. You can confirm the software version has changed from the FCON **Local Settings** sub-menu.