

AIRcable OS Command Line Version 0.6 SPP Documentation

All AIRcable OS products come with a standard BASIC connection software installed. The program is responsible for controlling the incoming and outgoing serial connections. It controls the SPP profiles available on the AIRcable OS product.

The AIRcable OS supports secure one-to-one type of connections, called the **cable-modes** and service oriented one-to-many and many-to-one type of connections, called the **service-modes**. Each of these modes have a slave mode, which allows incoming connections and a master mode, which initiates connections. Please see later in the text for details.

In Service-Slave mode, the AIRcable OS allows other Bluetooth devices to make connections to the AIRcable OS. This is the factory default mode. The default PIN code is set to '1234'. In this mode the module is discoverable and any device with the right pin can connect to it.

Every time you power the unit, or manually reboot it, you will see that first the LED comes on. This indicates that the AIRcable Operating system is booting. It will take maximum of 10 seconds to boot. The LED will go off when the OS has booted.

At this moment the AIRcable OS starts its services. The BASIC program installed allows reconfiguration and FTP access to the BASIC program and the configuration files for the next 6 seconds. After that and without interaction from the command line interface the FTP and Obex message services will be switched off.

Accessing to the command line:

By default the AIRcable will be in discoverable mode so you can open connections to it.

Here are the steps you have to follow:

1. Discover the AIRcable.
2. Make a connection to the serial service SPP.
3. Type +++ and press enter (you have 5 seconds to do this).
4. The command line is accessible.
5. Configure the device behavior with the command line.
6. Configure the PIO list.

To notify the command line has started you should see this:

```
AIRcable OS command line v0.6
Type h to see the list of commands
AIRcable>
```

NOTE: it can take up to 2 seconds to the interface to be launched

This interface is designed to be user friendly and intuitive. All commands explain themselves interactively. Type a one letter command to execute each command (Depending on the version of your OS, you might need to press enter)

NOTE: The only device with SPP command line is the AIRcableSMD the rest of the devices has a command line over RS232 at 115200 bauds 1 stop bit and no parity. Some commands are missing in that version.

Links:

[Command Line Version 0.6 SPP Package](#)

[Command Line Version 0.6 Package](#)

[AIRcable Open Source Site](#)

[AIRcable Development Blog](#)

List of commands

Help *h*

The `h`-command will list you the list of all the commands available, here is the output:

```
AIRcable>h
h: help, l:list
n: name, p:pin, k: name/pin settings,
b: name filter, g: address filter
c: class of device, u:uart, d:date,
i: inquiry, m: master, a: mode,
o: obex, j:relay mode pair,
e: exit, r:reboot, s:shell,
q: PIO settings
```

Settings listing *l*

The `list` command `l` shows the current settings from the module.

```
AIRcable> l
Command Line v0.6
Name: AIRcable
Pin: 1234
Class: @0000 = 00C2 0104 001A
Baud Rate: 115200 bps
Date: 20050531T192100Z
BT Address: 0050C258512E
BT Status: 00000
Name Filter: AIRcable
Addr Filter: 00A8FFFFFFF
Mode: Service - Slave
Unpaired
```

- Command Line v0.6 : this is the command line version number.
- Name: AIRcable : this is the name other devices will see when the module is inquired
- Pin: 1234 : this is the pin this module will return, when other devices request it while pairing process.
- Class: @0000 = 00C2 0104 001A : The first 2 numbers are the class of device, according to the Bluetooth specification. The 3rd is the version number of the operating system firmware.
- Baud Rate: 115200 bps : This are the baud rate setting, it can show the amount of bps, or External if you chosen it on devices that has support for external baud rate settings.
- Date: 20060531T192100Z : Some devices like AIRcable Industrial can make use of dates, this is the current date of the module.
- BT Address: 0050C258512E : This is the Bluetooth address of this module.

- BT Status: 00000 : This is the status of the Bluetooth Stack, see the programming manual for further information.
- Name Filter: AIRcable : While on cable mode devices can be filtered by name patterns, this is the pattern. In this case the module will connect to modules whose name start with AIRcable
- Addr Filter: 00A8FFFFFF : Plan is to allow filtering on Bluetooth addresses in the future. Not implemented yet.
- Mode: Service - Slave Unpaired : This shows the current automatic mode from the module.

Friendly name setting *n*

With the *n* command you can set the friendly name of the module, to the name you enter here the module will automatically add a number that is unique to each device.

```
AIRcable> n
New Name: AIRcable OS
```

PIN setting *p*

With *p* you can set the pin for this module, for security reason more than obvious it is recommended that you change the default pin 1234 to any other thing. The pin can be up to 15 characters, and you can use any of the 256 characters that the ASCII code define.

```
AIRcable> p
New PIN: 5AbC{}35asd
```

Name/Pin Settings *k*

Command line V0.6 SPP includes some new features referring to naming and pin handling. Each device has a unique name that identifies it from other AIRcable devices, this new command line has three new options regarding this. One is to not change anything, the other is to append the unique number to the name (SMD devices will append the command line version), and the last option is to append the unique number plus changing the pin you choose for the unique number.

```
AIRcable> k
Name/Pin settings:
0: Don't add anything,
1: Add uniq to the name,
2: Add uniq to the name, set pin to uniq: 0
```

Name filtering, and Address filtering settings *b* and *g*

With those commands you can set the filters the module will use.

```
AIRcable> b
Enter the new name filter: AIRcable OS
AIRcable> g
Enter the new address filter: 112345
```

Class of device *c*

This command will let you define the class of device. Check the programming manual for more information about this.

```
AIRcable> c
Type the class ofdevice as xxxx xxxx: 1234 5679
```

Uart *u*

This command lets you select between internal baud rate, or external baud rate settings (switches on AIRcable Serial OS). If you enter a value of 0 then the uart settings will be taken from the switches any other case it will use the internal baud rate you enter, the value you need to enter is the baud rate divided by 100, for example for 115200bps

you need to enter 1152 and for 9600 bps you need to enter 96. After setting the baud rate you will be asked for parity and stop bits settings, simply follow the On Screen instructions.

```
AIRcable> u
Enter new Baud Rate divide by 100, or 0 for switches: 560
Parity settings:
0 for none
1 for even
2 for odd: 0
Stop Bits settings:
0 for 1 stop bit
1 for 2 stop bits: 0
```

Date *d*

This command lets you set the internal clock for the module, if the module supports it. The format is: `yyyymmddThhmmssZ`

```
AIRcable> d
Insert new date, check the manual for formating: 20061118T172600Z
```

Manual Inquiry *i*

This command will start inquiring for 16 seconds. While the inquiry is active, the command line interface does not respond to commands.

```
AIRcable> i
Inquiring for 16s. Please wait.
Found device: 000A8401C442 AIRcable 321
```

Manual Master *m*

This command will initiate a SPP connection to the Bluetooth address typed in manually. If the connection fails you will be returned to the command line.

```
AIRcable> m
Please input the addr of your peer: 000A8401C442
```

Automatic mode setting *a*

This command will let you chose which is the automatic mode into which the module will get into, when you exit the command line.

Normal procedure to pair two AIRcable OS devices, is to put on into cable slave mode and the other in cable master mode.

Then both will link up automatically and pair. Pairing process will take about 20 seconds. There is a 2 minutes timeout for pairing to succeed. If unsuccessful, the AIRcable will go into manual mode. Pairing procedure has to be started again.

```
AIRcable> a
Select new mode
0: Manual
1: Service Slave
2: Service Master
3: Cable Slave
4: Cable Master
Mode:2
```

Obex and ObexFTP enabling/disabling *o*

Until version 0.5 Obex and ObexFTP were handled as two different things regarding security. We thought there was no need for this, and unified the concept. Not only that, we had also added another security level, in the past Obex and ObexFTP were made invisible but there were still available. Now you have three different levels of security: Always visible, Visible only for two minutes after boot up or when command line is active, or totally disabled. From the security point of view the last one is the most secure because it will make it impossible to access the file system from outside the device, while the first one is the most weak.

```
AIRcable> o
```

Obex/ObexFTP settings:

0: Enabled only on command line

1: Always Enabled

2: Always Disabled

Choose Option: 2

Note: *If you choose option 2 you will need to choose option 0 or 1 in the future if you want to update your command line version.*

Exit e

This command will end the command line interface, and get the module into the automatic mode that was selected before.

```
AIRcable> e
```

Bye!!

Reboot r

This command will reboot the unit. It takes about 10 seconds to the unit to be fully restarted, please try keep the unit with electric power while it is rebooted.

```
AIRcable> r
```

Rebooting, please do not disconnect electric power

Relay Mode Pair j

This command must be used with are exclusive relay mode, and must be run on the module that is going to do work as “Bridge” (Read Modes section for more information about this), this command lets you pair with the slave peer of the relay chain. It will simply ask you for the Bluetooth Address of the device, will try to pair and in case it is successful advice you about it, any other case it will return to the command line with out any message. From version 0.5 upwards there is a new feature related security on Relay Mode, this new feature allows you to choose between a Service like behaviour or a Cable behaviour, the difference between both is visibility of the relay. On the first one the relay will be always visible to other devices, while on the second one it will be visible only for 2 minutes after the device was booted up. The idea behind those two mode is cascading, suppose you want to cascade two or more relays then having all your relays visible to anyone can be a problem, this way you can make sure that only those who know the address of your relay can connect to it.

```
AIRcable> j
```

Enter the address of your peer: 000A8401C442

Please choose which kind of relay you want:

1: Service Relay

2: Cable Relay

Shell s

This command will leave the command line and enable the shell.

```
AIRcable> s
```

Enter the address of your peer: 000A8401C442

Trying to pair

Pair successful

PIO Settings q

This command lets you define where each I/O Pin the command line is expecting is connected. It receives a string where each char represents a PIO, if the char is '0' then that PIO will not be used. Numbers are 1-9 for PIO(0-8) and A-Z for PIO(9-36).

Here you have what each char means:

1. BLUE LED: Bluetooth Stack State,
2. GREEN LED: Power State.
3. BUTTON: Button used to control connections (Works like the SerialOS button).
4. RS232 POWER OFF: Used to control RS232 power.
5. RS232 POWER ON: Used to control RS232 power.
6. DTR: PIO where DTR is connected to the RS232.
7. DSR: PIO where DSR is connected to the RS232.
8. POWER SWITCH: Put the module into power save mode when set to logic 1.
9. COMMAND LINE PIN: Set Command Line Accessible when the value is different from logic 1 (Logic 0 or not connected)
10. BATTERY MEASUREMENT ENABLED : Set this to one if you want to control the power of the batteries (This will use the analog channel).

Note: This command will automatically reboot the module, you will lose the command line connection.

```
AIRcable> q
```

```
Please Input PIO settings.
```

```
Please check DOCs for More Information: K000000000
```

Debug z

This is a very helpful feature to use for finding problems. We have 2 levels of debugging plus an online shell when a slave connection is opened, plus the possibility to enable/disable Obex and ObexFTP from only one command. When you do input z you will be asked for a string, that string has the next format ABC, where every letter can be either 0 or 1 depending if you want to enable or disable the debug function. For example "000" switches off all debugging.

A is for lines dumping

B is for stack trace dumping

C is for FTP/OBEX (1 always enabled, 2 always disabled)

Connection and Automatic Modes

AIRcable modules support 5 different automatic modes plus a manual mode.

The automatic modes allow or initiate connections without user interaction.

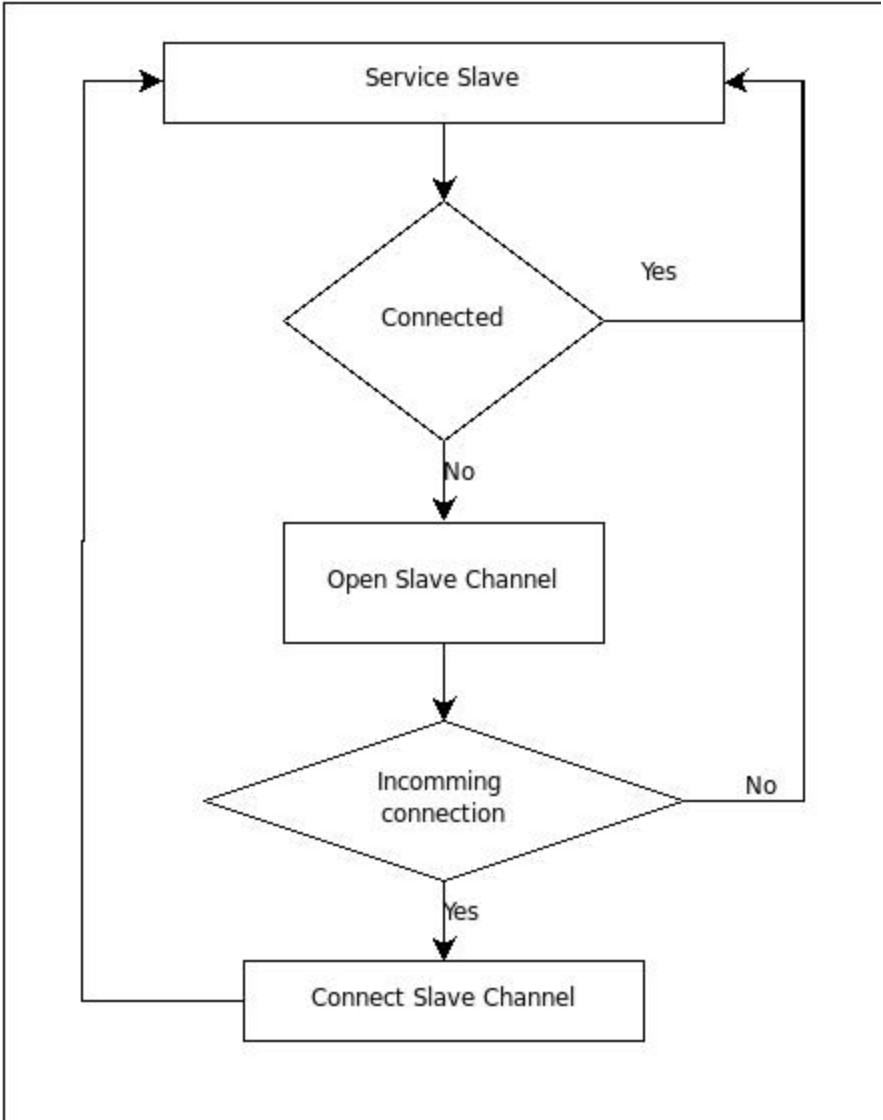
For cable replacement applications, the cable-slave and the cable-master modes are a convenient way to pair two AIRcable OS devices to they make a "wireless cable".

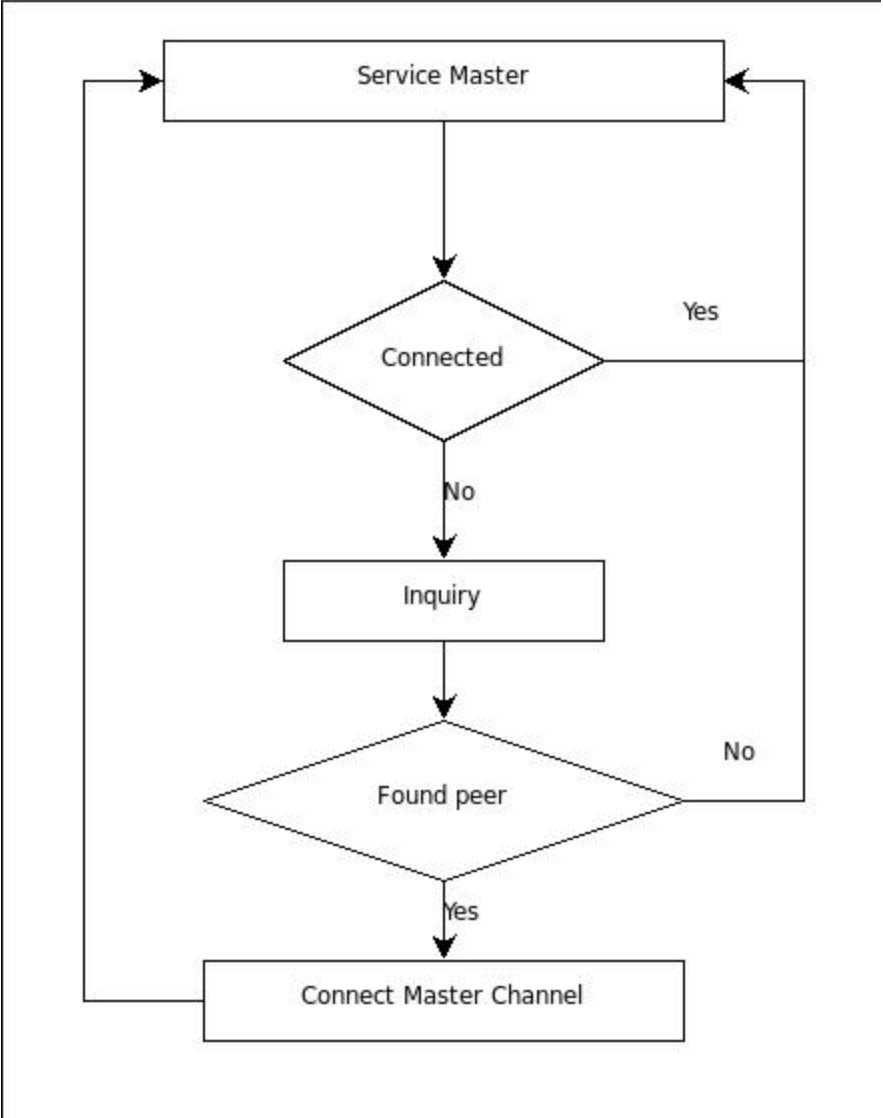
AIRcable OS products support multiple connections at a time, up to 2 SPP and 2 FTP and Obex connections simultaneously.

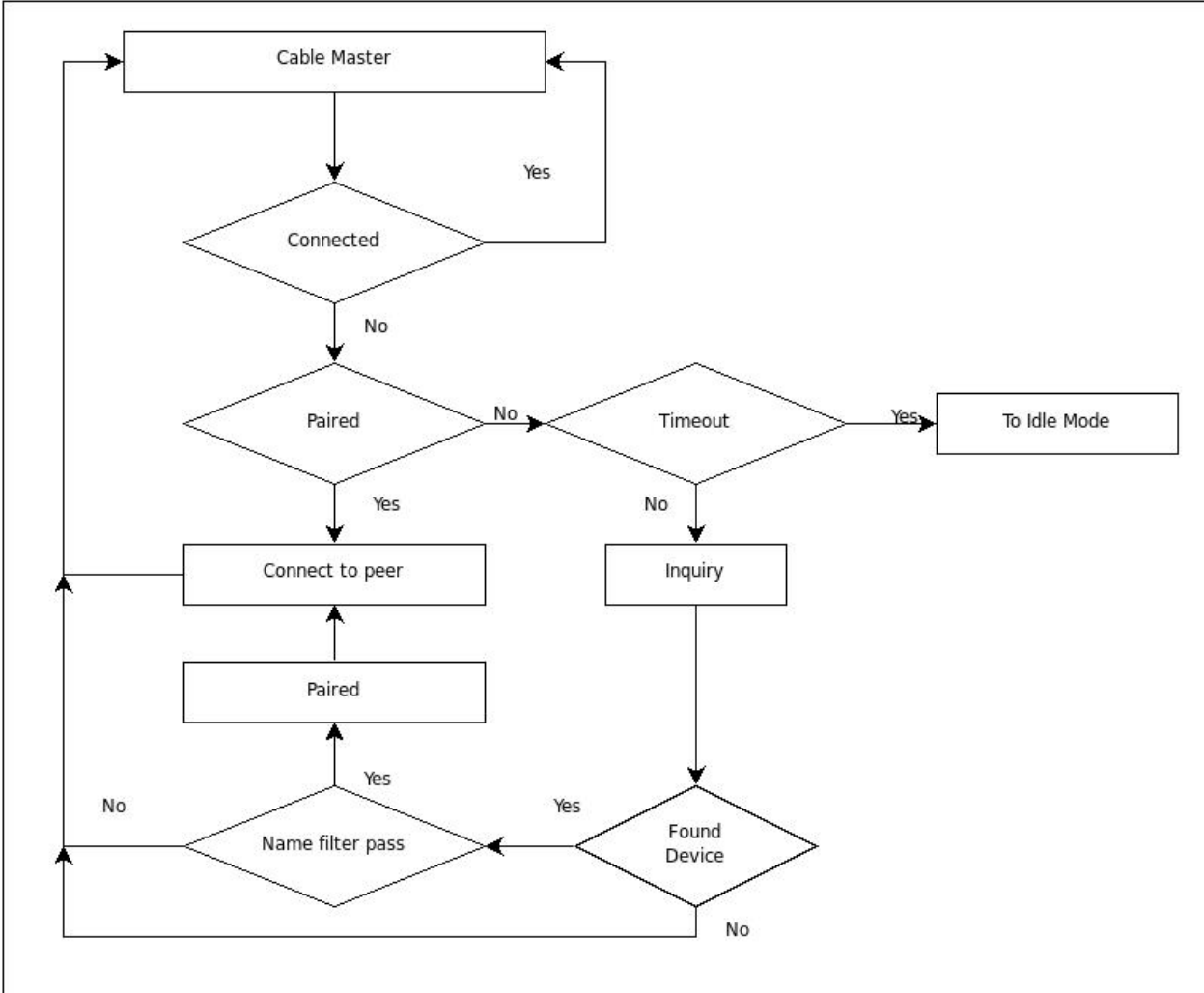
The service modes are used to allow connections from multiple devices (service-slave) or initiate connections to different devices (service-master). A fixed pairing is not needed,

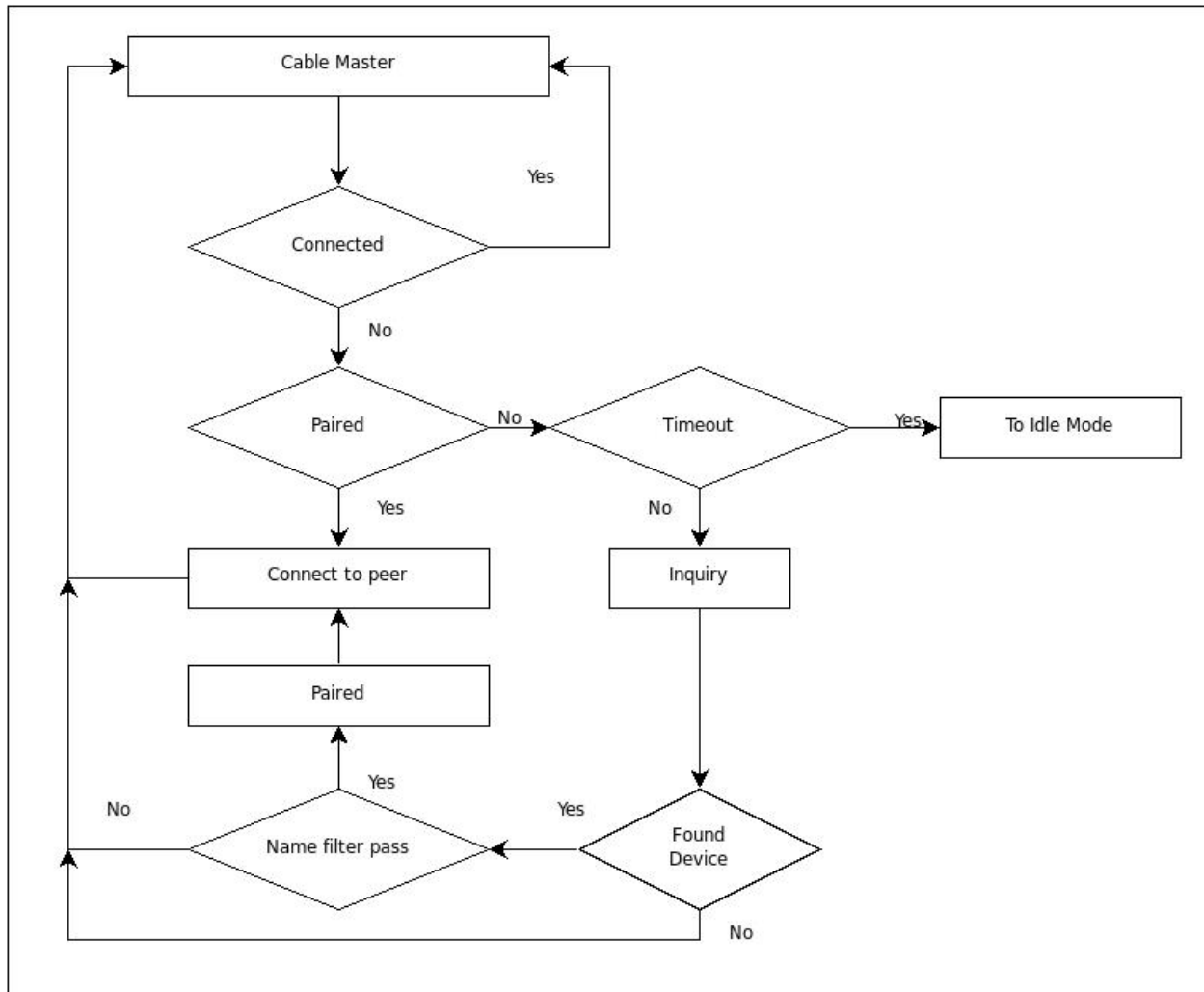
though authentication via PIN code is always required. In the master modes, filter can be used to restrict connections to only the devices that are part of a system.

Here are some diagrams that shows how each mode works:









Relay Mode:

The 5th mode is the **relay-mode**. One AIRcable will act as a Bluetooth range extender between two other Bluetooth devices, such as a Palm or cell phone and an AIRcable Serial. This bridge will relay data from the Palm to the destination and vice versa. With this combination the AIRcable can extend the range of a Palm, laptop, PocketPC or cell phone to any range required. Multiple relays can be used between the destinations.

This mode is quite special, first of all you will need three modules, at least one of the three must be an AIRcable OS enabled device. In this mode you connect the Master to the Relay, and the Relay to the slave. When both connections are successful established the Master is indirectly connected to the Slave through the relay. So the relay is only a bridge, in case either the slave or the master connection gets closed by anyway, automatically the relay will close the other connection, and will wait for the master to get connected again.

For security reasons the relay needs to pair with its slave, this can only be done from the command line using commands *i* for inquiring and command *j* to pair, once the pairing is successful you exit the command line. Then when ever the relay gets a master connection request, it will link the slave channel to the master channel.

The relay will accept all the connections that it gets from the Master like the service slave does.

Changing the Mode:

There are 3 ways to change the mode the AIRcable runs into:

- through the command line, as described above
- with button presses (only on devices that have buttons)
- by uploading a piece of code through ObexFTP.

Each mode can be identified by the LEDs of the module. The AIRcable Industrial and the AIRcable SMD only have one LED, described as the Blue LED.

- *Idle:* Green On, Blue Off.
- *Service Slave:* Green On, Blue fast blinking.
- *Service Master:* Blue On, Green fast blinking.
- *Cable Slave:* Both On Both Off
- *Cable Master:* Once one on and the other off, and the the other way, and so on.
- If a connection has been established both led will turn on

Using Button to switch modes:

If you have an AIRcable Serial OS with a pairing button, you can use the button to switch between automatic modes. While you are not connected a *short* button press will switch the device from **Master** to **Slave** and from **Slave** to **Master**, preserving the **Service** or **Cable** mode it was running and starting the pairing process again. For example if you were on **Service Slave** it will automatically switch to **Service Master** and will start searching for other bluetooth devices. If you were on **Idle** mode and do a *short* button press you will get immediatly into **Cable Slave** mode.

In case you do a *long* button press, more than 3 seconds, the device will behave a little different. If you were connected, then the module will reboot and will *restart* the mode it was running, that means that it will start the pairing process all over again, for example if you were on **Cable Slave** the device will reboot and will get into **Cable Slave** again but will be **unpaired**. In case you were not connected and you do a *long* button press, the module will reboot and get into idle mode.

Here is a diagram that shows how the device handles button press.

