WX-5095
MP3 ON-HOLD PLAYER

ACMA Supplier's Code N468

ISO9001 Certified

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	Version 1.1	17/07/2007	External Control diagrams
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Table of Contents

1. Document Overview

This document describes the operation of the **X-Stream** MP3 On-Hold Messages/Music player. This includes:

- Power input

- Indicators

- Line-level analogue audio output

- Ethernet Controller jack

- How to update the Message/Music played to callers placed on-hold

- Secure Digital (SD) or Multi Media (MMC) memory Card

- Internet Browser control

2. Description

X-Stream is a specialized MP3 audio player for playing messages & music to telephone callers that are placed on-hold, or to customers at point-of-sale locations. It updates itself using the Internet.

- ❑ Configuration & message updates via Web Browser interface.
- ❑ Supporting material/manual supplied on CD.
- ❑ External Control Connector allows for future external trigger start/stop operation.
- ❑ Reset switch for restoring factory settings and recovery from Net configuration problems.
- ❑ Electrical safety & Isolation complies with ACMA TS001, AS/NZS 3260, AS/NZS 60950.
- ❑ ACMA Supplier's Code Number N468.
- ❑ Three year warranty.

2.1   MP3 Explained

MP3 stands for <u>MP</u>EG Layer-<u>3</u> audio-compression format. It is the most popular audio-coding scheme on the Internet. MP3 allows efficient compression of audio files by a factor of up to 12 with little loss in perceivable quality from the original source material. By ripping down audio files into MP3 format, file sizes are significantly reduced, less memory is required, files can be sent more quickly, and yet a high standard of audio quality is maintained.

2.1.1 **X-Stream** MP3 Storage & Playback

Multiple MP3 Audio files can be manually or automatically retrieved from the WaveCube Update Centre at www.wavecube.com/control.php & uploaded to the **X-Stream** Secure Digital Memory Card. By default, the audio files are played back sequentially in a continuous loop. Audio files are stored on a <u>S</u>ecure <u>D</u>igital (SD) Card or you can use a <u>M</u>ulti <u>M</u>edia <u>C</u>ard (MMC) if you prefer.

2.1.2 Network

You just need to plug the **X-Stream** into a network (Ethernet) jack & it will automatically start checking for new messages whilst continuing to play the current one. You do not even need to have a PC in the same building if you don't want to, just so long as there is an Ethernet LAN Switch, Router or Broadband modem.

2.1.3 Internet Browser Control

You do not need to have any special software, you can use Internet Explorer, Firefox (or other Browser) on any PC to customise, update or check your **X-Stream**.

2.1.4 Updates from the WaveCube Server

Automatic & manual message updates can be retrieved directly from the WaveCube Update Centre, with or without human intervention. It's a bit like ringing your voicemail service to get your new messages. You can collect new messages anytime, day or night. Naturally, this can be an automated procedure as with the **X-Stream**.

This avoids the complications associated with emails such as multi-part attachments, Server email size limitations, message formats, etc. Email updates can still be possible, and will be supported, but from extensive experience they are best avoided.

Retrieving message updates from the WaveCube Server also overcomes the problems of firewalls, so long as HTTP access via port 80 is available.

In summary, the **X-Stream** is a self-contained unit that just plugs into a network port & automatically checks the Internet for new messages. It doesn't matter where you plug it in, as long as there is access to the Internet, it works the same everywhere. Sending updates to the WaveCube Server rather than sending updates to the **X-Stream** itself puts an end to Email attachment limitations & to Firewall problems!

2.1.5 Message Update Process Summary

1. Upload new message to www.wavecube.com/control.php using your *User Name* & *Password*
2. The **X-Stream** regularly polls its account at wavecube.com and automatically downloads any new message(s)
3. The WaveCube Auto-Mailer system emails you with an **X-Stream** successful download notification

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2.2   Features

1) True "set and forget" operation. WaveCube **X-Stream** automatically updates its message content from the Internet without any user intervention.

2) No software to install or learn. Most installation environments can access the WaveCube **X-Stream** by just connecting it to their Local Area Network then configuring it with a web browser. You'll be running in minutes.

3) Nothing more to buy. The WaveCube **X-Stream** connects straight to your PABX or Telephone system Music On Hold port and is fully ACMA approved.

4) Multiple message playback from readily-available and inexpensive Secure Digital Cards with up to 1 Gigabyte storage capacity - expandable within seconds.

5) Peace of mind. Automatic confirmation emails advising of unit status and content delivery success.

6) Some features in point form are:

   ▪ MP3 playback
   ▪ SD/MMC Card file storage (hot-swappable)
   ▪ Multi-file support
   ▪ Auto-Start on power-up
   ▪ Integrated Ethernet Controller
   ▪ Web Browser configurable
   ▪ Automatic checking, up to every minute, of the WaveCube Update Centre for MP3 updates!
   ▪ Supplied preloaded with superb royalty-free music ready for immediate use

7) Customer premises only requires (within two metres of the **X-Stream**):
   ▪ 240Vac Socket Outlet
   ▪ Ethernet port (broadband Internet connection)
   ▪ Music On-Hold socket, either RJ12 or 3.5mm phone (mono or stereo)

2.3.   WaveCube X-Stream Basic Installation Instructions

1. Unpack your WaveCube X-Stream and you'll find the X-Stream with an SD Card already inserted into the slot. The default On-Hold audio track will be pre-loaded. You'll also find a 230Vac/12Vdc Power adaptor, a two metre Network cable (blue) and an Audio cable with an RJ12 plug on one end and a 3.5 mm mini (phone) jack on the other end.

2. Plug the 230Vac/12Vdc power adaptor supplied into a working 230V socket outlet and plug the dc plug into the power socket on the back of the X-Stream. The red power light and the green play light will come on within five seconds.

3. Plug the network cable supplied into a working LAN socket and into the Ethernet socket on the back of the X-Stream. The yellow Ethernet LED in the socket will come on and the Ethernet green LED will flash as data is interchanged. The X-Stream should automatically obtain its IP address from your Router within 60 seconds.

4. Plug the audio cable supplied into the Music on Hold input of your telephone system (refer this to a Telco technician if necessary) and into the Audio jack at the back of the X-Stream.

5. Open your Web Browser and enter the X-Stream Browser Configuration Address found on the base of your X-Stream. Now follow the **5.1.1 Local Configuration** instructions.

3. Connections

3.1 Power

The **X-Stream** runs from a 12Vdc power source. It draws less than 200mA . As standard, the unit is supplied with an approved 240Vac / 12Vdc, 300mA power adaptor with a concentric dc power plug, 2.1mm centre pin positive.

3.2 Audio Out

The isolated audio is output on the RJ12 jack for connection to the Telephone system's Music-On-Hold (MOH) port. The default output is around 500mV p-p to suit most modern phone systems however this can be adjusted on the **X-Stream** web page. There is an inbuilt Line Isolation Unit (LIU) so there is no need to have an external LIU.

There are three audio output configurations possible.

1. Standard Single Feed – use the RJ12 jack with the inbuilt LIU. This is the most common configuration with either mono or stereo (combined to mono) audio.

Viewed from front of socket
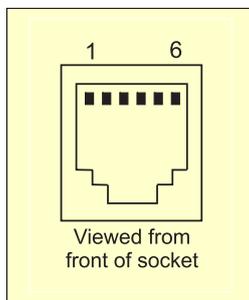
PIN	DESCRIPTION
1	Not connected
2	Not connected
3	Ring (Lb) – Sleeve, ground return
4	Tip (La) – Signal, left & right audio mixed to mono
5	Not connected
6	Not connected

2. Dual Mono feed - use the stereo output and external LIUs to feed two isolated inputs of the phone system(s) with the same synchronised (dual mono) audio.
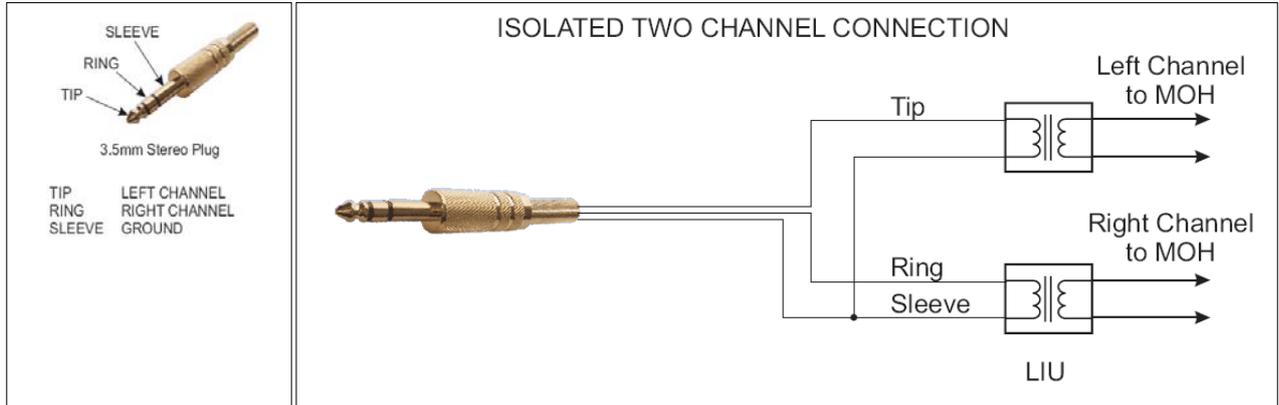

3. Dual Discrete Feed - use the stereo output and external LIUs to feed two isolated inputs of the phone system(s) with separate (independent) audio tracks – see wiring diagram above.

Note : In order to get a different sound track playing on each stereo channel, the MP3 file would have to be edited with one message on the left channel, and another on the right channel, prior to loading. The two channels will need to have tracks of the same length to avoid silence periods on the shorter channel.

3.3 Ethernet Controller Comms

This is the TCP/IP interface to the LAN/WAN and the Internet. A standard CAT5 patch cable (supplied) is used to connect the **X-Stream** to an Ethernet Switch, Router or Broadband modem. HTTP access via port 80 must be available for the **X-Stream** to poll www.wavecube.com/control.php
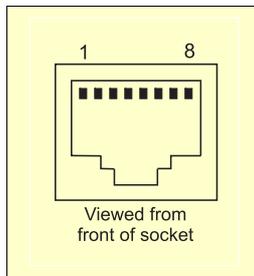
PIN	DESCRIPTION	
1	TXD +	Pair 3 (T568A)
2	TXD -	Pair 3(T568A)
3	RXD+	Pair 2 (T568A)
4	Not connected	
5	Not connected	
6	RXD-	Pair 2 (T568A)
7	Not connected	
8	Not connected	

4. Indicators

4.1 Power

The red *POWER* LED indicates that 12Vdc power is connected.

4.2 Play

The green *PLAY* LED indicates that the file(s) on the SD Card are currently playing. When the SD Card is ejected, this LED will flash.

Steady: An SD Card is inserted and an MP3 audio file is playing.
Slow flash: No SD Card is inserted.

4.3 Load

The yellow *LOAD* LED indicates that the **X-Stream** is in the process of downloading a new MP3 file from wavecube.com. When the SD Card is ejected, this LED will flash.

On: A new MP3 file is downloading & being written to the SD Card
Off: An SD Card is inserted and an MP3 audio file is playing.
Slow flash: No SD Card is inserted.

4.4 SD Card Slot backlight

The blue LED backlight glows steadily to indicate the proper insertion of a FAT16 formatted SD Card.

5. Downloading New Messages

Audio files are written to the SD Flash Card in one of three ways:

- Connect the **X-Stream** to an Ethernet Switch or Router with HTTP access via port 80 enabled. The **X-Stream** automatically polls its account at www.wavecube.com/control.php

<u>**OR**</u>,

- Connect the **X-Stream** to an Ethernet Switch or Router and, via your Browser, type in the Browser Config address (eg. wx1417) to open the **X-Stream** homepage and select Upload MP3:

-
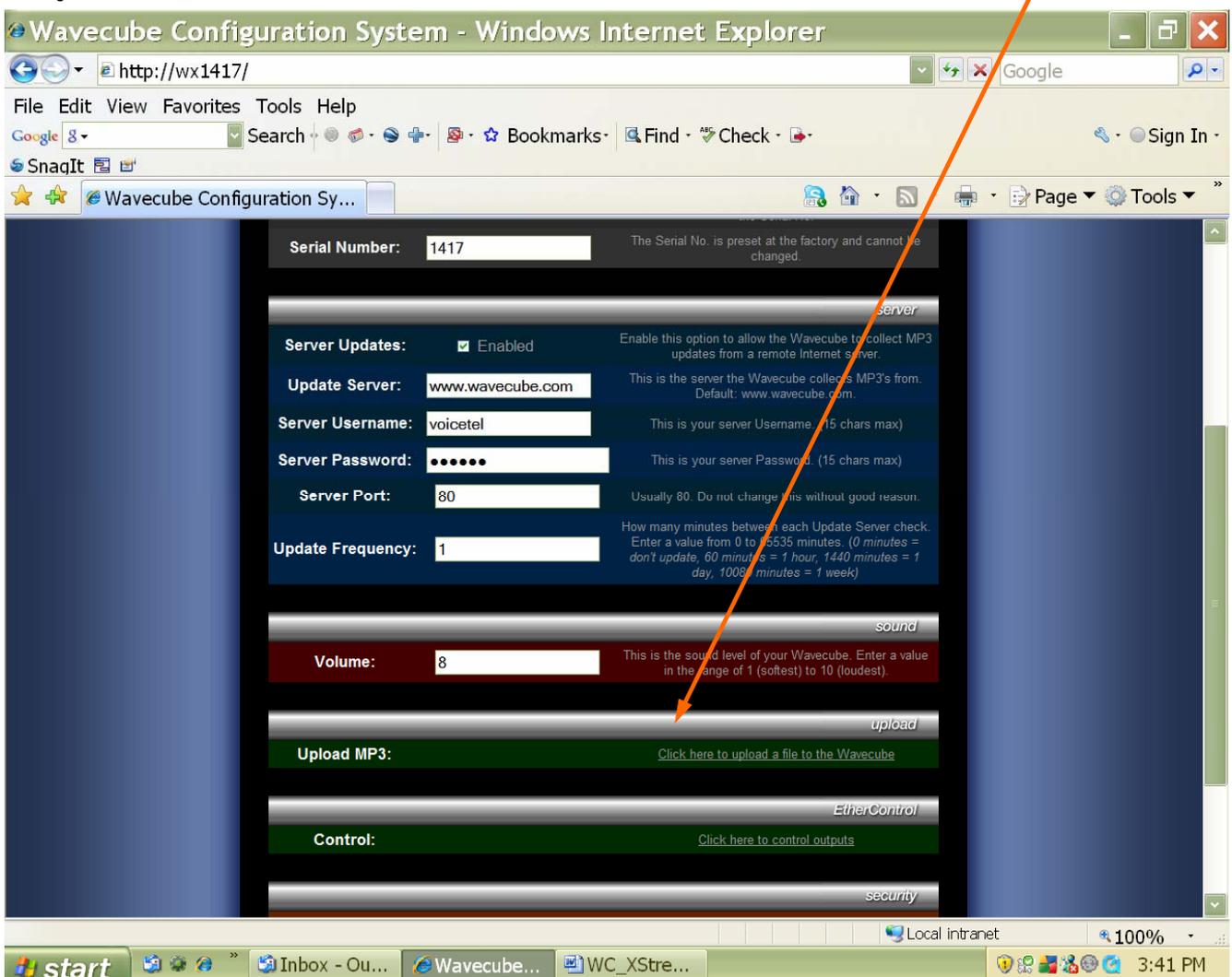
<u>**OR**</u>,

- Removing the Card and placing it in a Card reader (format FAT or FAT16) where files can be 'dragged and dropped' within Windows. See also section 5.2

5.1   Using your Web Browser Internet Explorer, Firefox etc.

X-Stream is connected to an Ethernet Switch or Router (with HTTP access via port 80 enabled) using the supplied patch lead. The **X-Stream** automatically polls its account at WaveCube Update Centre www.wavecube.com/control.php. Note that the **X-Stream** account number is the same as the first serial number your account.

The **X-Stream** unit does not need or use client software (eg. Internet Explorer™) on the LAN it is connected to for everyday operation. It is the **X-Stream** Ethernet Controller that retrieves message updates. The only requirement for the **X-Stream** is that it can reach the HTTP Server, at which time the **X-Stream** logs in and receives its message update(s).

(HTTP is short for Hypertext Transfer Protocol, used to transfer or convey information on the World Wide Web).

5.1.1 Local Configuration

The integrated Homepage Control Panel allows you to configure your DHCP, Username, Password and other settings. This internal configuration can only be done on your LAN.

Launch your Internet Browser and enter Browser Config Address wx[serial number] eg. wx1340 and then this Homepage control panel will appear:
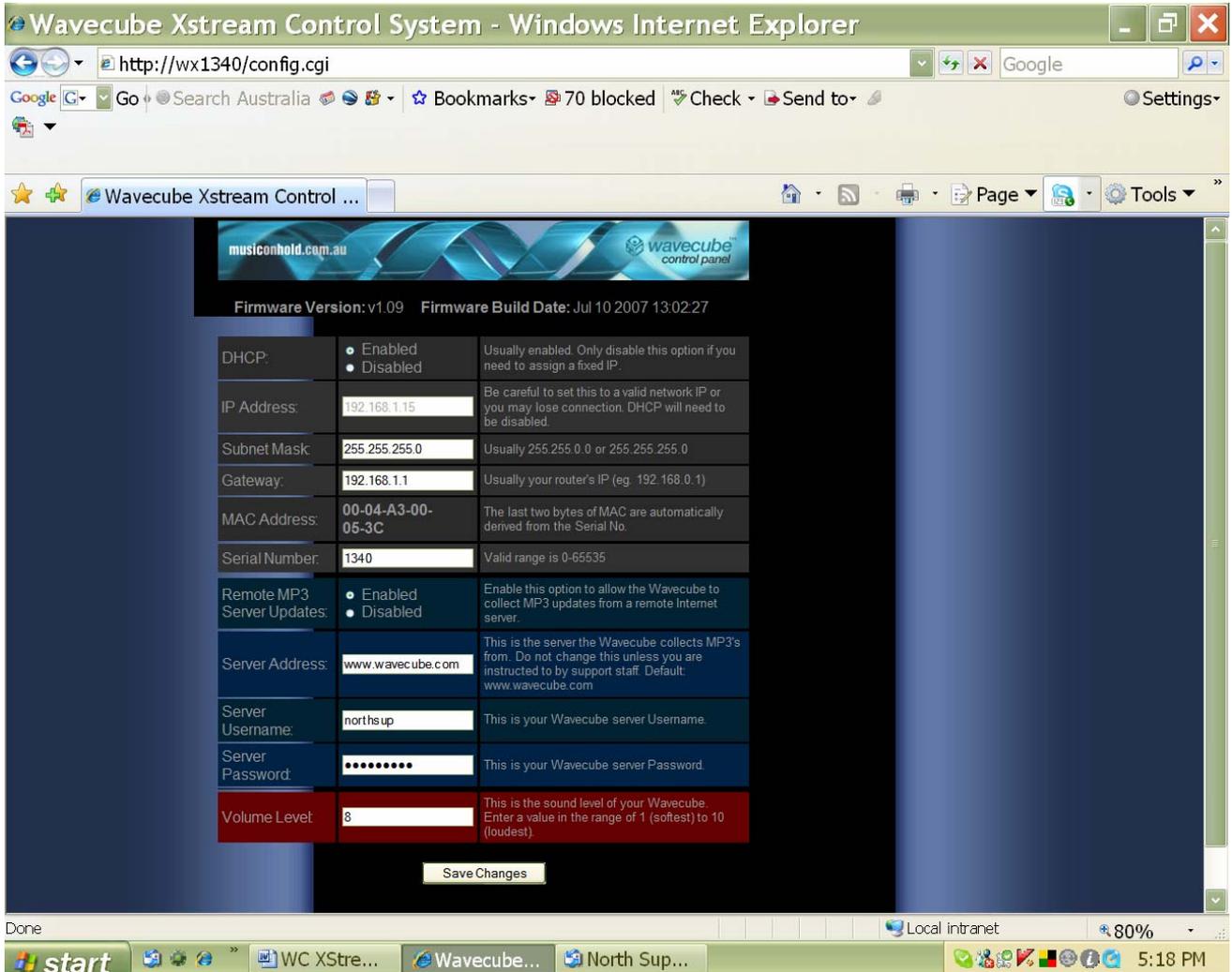

Check the appropriate boxes and set the required parameters. You'll find your **X-Stream** serial number on the base of the unit. Once the required information has been saved, the **X-Stream** checks, verifies & downloads any new MP3 audio file(s) from the WaveCube Server and starts playing.

5.1.2 Remote Upload

You need to upload new MP3 Files to the appropriate account at the WaveCube Update Centre www.wavecube.com/control.php before the **X-Stream** is able to download them. It periodically checks its account and automatically downloads any new MP3 files. From the central dispatch site, you or your content provider can upload file updates to individual accounts or to an address book of Customer stores for simulcast updating. The **X-Stream** (as long at it has HTTP access) will take care of the rest. It will automatically check for new messages and then check that the file is in the MP3 format before downloading it.

Log in to the WaveCube Server using your Username & Password and make your way through until you'll see something like:
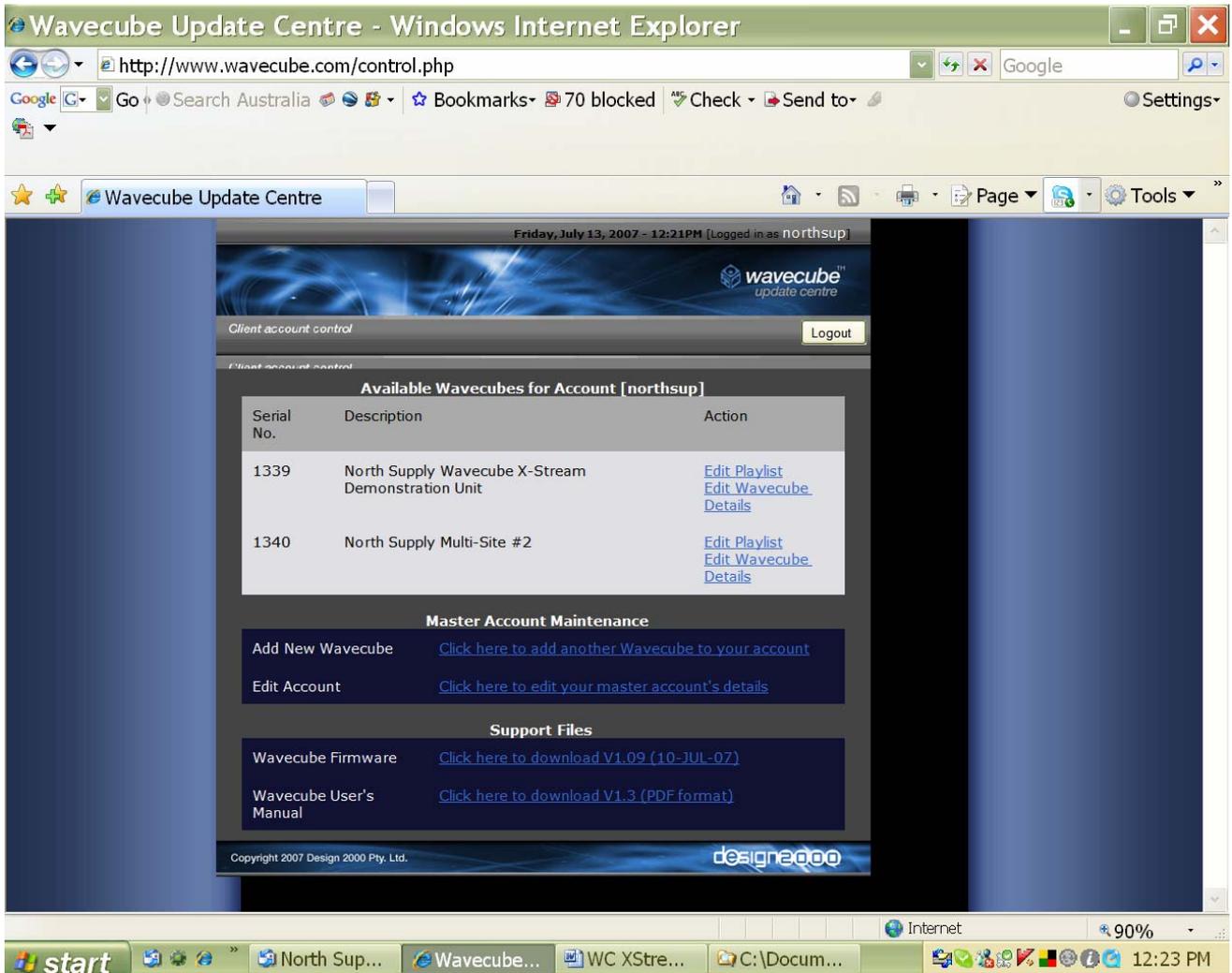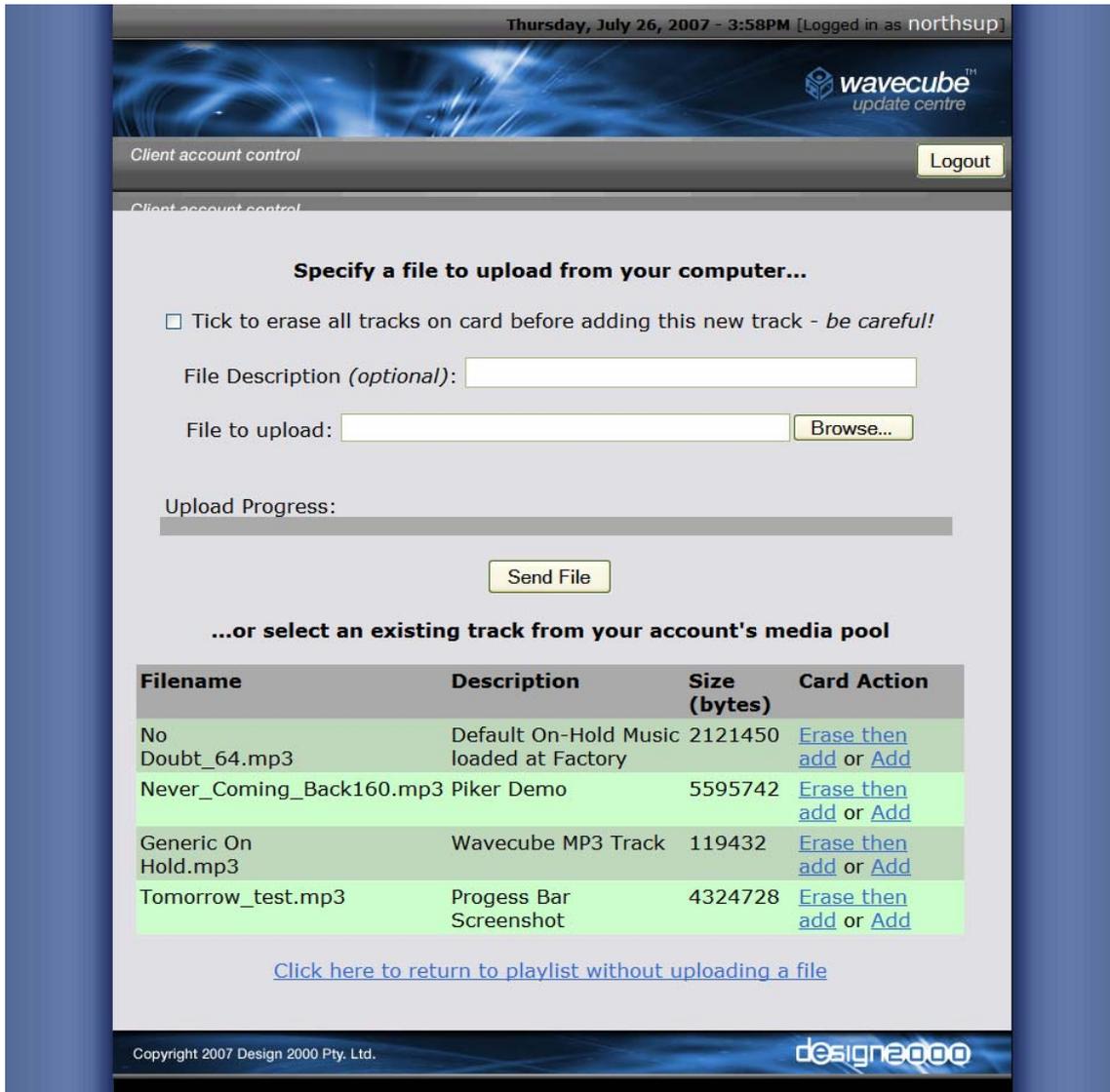

Click on the appropriate 'Edit Playlist'.
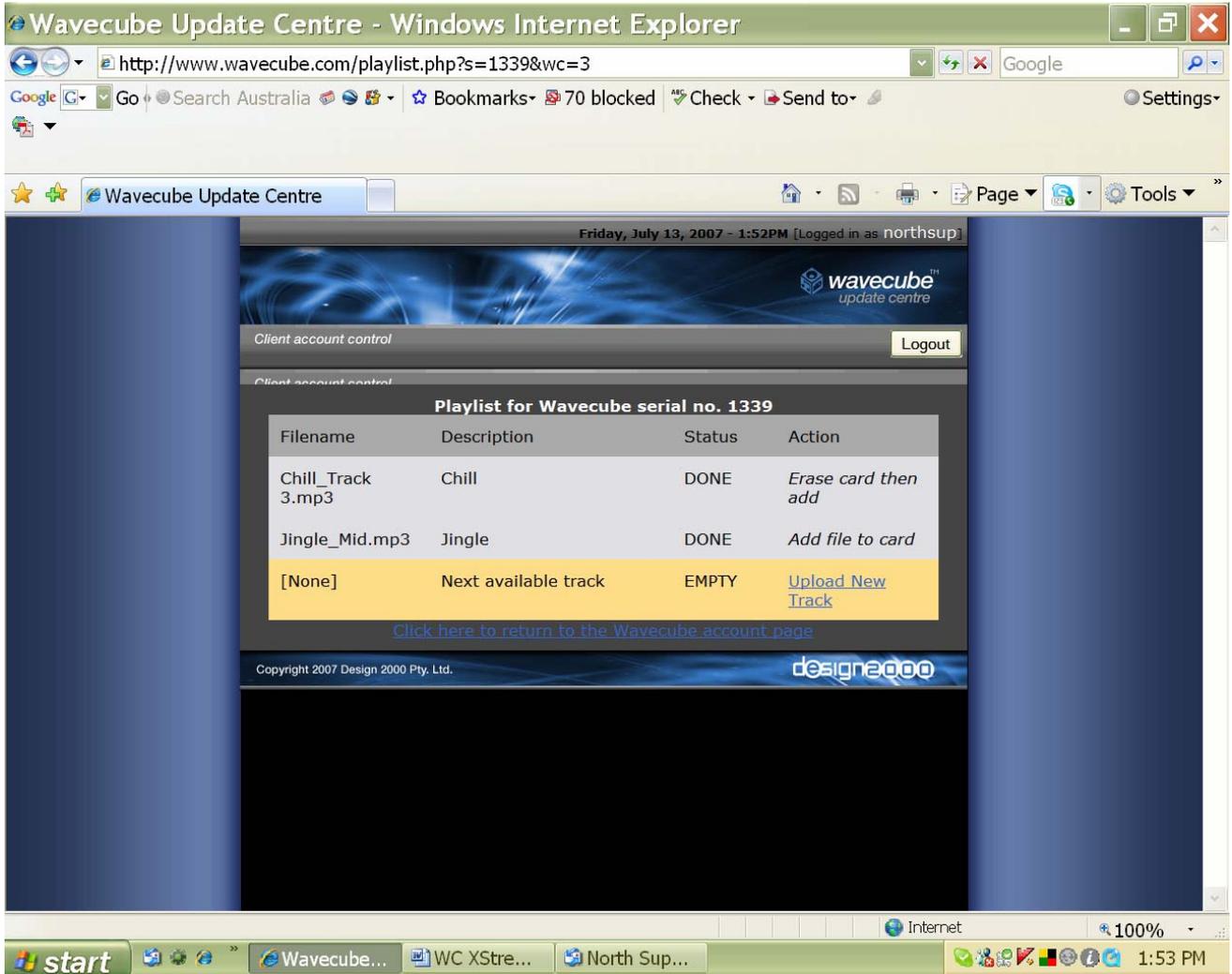
Click on 'Upload New Track'

First of all, tick the box if you want to erase & replace the current files(s). If you do not tick the box, the new file will simply be added to the Playlist. Browse & choose the required file, then click on "Send File". Do not close your Browser unit you receive the upload success message. You can simply minimize the window and continue working on other tasks during the upload process.

Each time a new file is uploaded to the WaveCube Update Centre, it is automatically copied to your account's Media Pool. You are then able to send files from your Media Pool to other **X-Stream**s in your account. Typically this would be used to send the same On-Hold message to all **X-Stream**s in the same account. The Media Pool also allows you to revert to a previous track for your On-Hold message.

Once the Server upload & **X-Stream** download processes are complete, you will receive an email success (or failure) notification.

5.2   Using an External Card Reader

The SD Card can be ejected from the **X-Stream** by applying gentle pressure, causing it to pop out of the slot. It can then be inserted into a Card reader and be seen as a mass storage device. MP3 files can simply be 'dragged' across to the Card. If you need to erase files, the Card will need to be re-formatted as a FAT or FAT16 file system before new file(s) are 'dragged and dropped' within Windows.

Note: SD Cards are 'hot swappable'. There is no need to remove power from the **X-Stream**. Playing automatically commences when another loaded SD Card is inserted.

DO NOT expect the WaveCube Server to keep track of file changes using a Card Reader/writer. It won't! Use either the WaveCube Server OR a Card reader to perform updates, not both.

6.   Sending & Receiving Hints

❑ Treat your password as a preventative measure against unauthorised access to your unit. Good passwords are at least 6 characters in length and contain a mix of letters and numbers (eg. RPS82QZ9). It is more secure if the password is not a human-readable word or common sequence of characters.
❑ Updates should perhaps be scheduled to occur after hours as no audio is output while the **X-Stream** is receiving a new MP3 file.
❑ The **X-Stream** supports multi-file updates.
❑ You can choose to add or replace files. Files are replaced by performing a complete erase prior to uploading a new track.
❑ Each time a new file is uploaded to the WaveCube Update Centre, it is automatically copied to your account's Media Pool. You are then able to send files from your Media Pool to other **X-Stream**s in your account. Typically this would be used to send the same On-Hold message to all **X-Stream**s in the same account. The Media Pool also allows you to revert to a previous track for your On-Hold message.
❑ Firewalls only need to have the usual port 80 or 443 open for normal Internet access.
❑ The WaveCube Auto-Mailer message is typically like "*Wavecube X-Stream serial no.1337 (IP:203.214.59.118) successfully downloaded an MP3 named "Never_Coming_Back.mp3" on Thursday, July 12, 2007 at 10:54AM. The total time taken to complete the download was 14 minutes, 56 seconds with an average transfer rate of 9991bytes per second. There are now 0 file(s) remaining in the download queue. Note: This is an auto-generated email and cannot be replied to*".
❑ Do not upload single files larger than 8 MB. The WaveCube Server has an 8 MB limit per transaction.
❑ The FAT file system limits the total number of tracks to 512 or less depending on the number of 'tiles' used. Reducing the length of the file names reduces the number of 'tiles' used, increasing the allowable number of tracks.
❑ If multiple updates are waiting, the **X-Stream** will process them one at a time.
❑ There is no **X-Stream** Client software that must be left running.
❑ Don't worry about some email accounts that have a limit on the size of attachments receivable. The **X-Stream** does not use email for message downloads, only for download success notification.
❑ In the **X-Stream** settings window, there is only DHCP (defaults to on), Username & Password to worry about. You can also adjust the volume (audio output level) if required.
❑ *Do NOT close the Update Centre window, or Logout, or use the back arrow during sending a file as this will inadvertently abort the upload. You can simply minimize the window and continue working on other tasks during the upload process.*

6.1 MP3 Volume Normalization

MP3 files should be 'normalized' prior to uploading or emailing. This is to maintain consistent output levels. An MP3 normalization program called MP3Gain is recommended for this purpose. It is freeware however it would be appreciated if you made a donation to the authors:

Download page:
http://mp3gain.sourceforge.net/download.php

Direct link to download current version:
http://optusnet.dl.sourceforge.net/sourceforge/mp3gain/mp3gain-win-1_2_5.exe

Tip!   The default setting 'Volume 89.0' can be increased to 95.0 when applying track gain to MP3 files. Setting the volume to 95 brings up the volume of MP3 files to a level of what you would expect from CD audio. Use 'Track Gain' rather than 'Constant Gain' if your message requires dynamic range. Do not use 'Album Gain' unless you specifically want level variations between tracks.
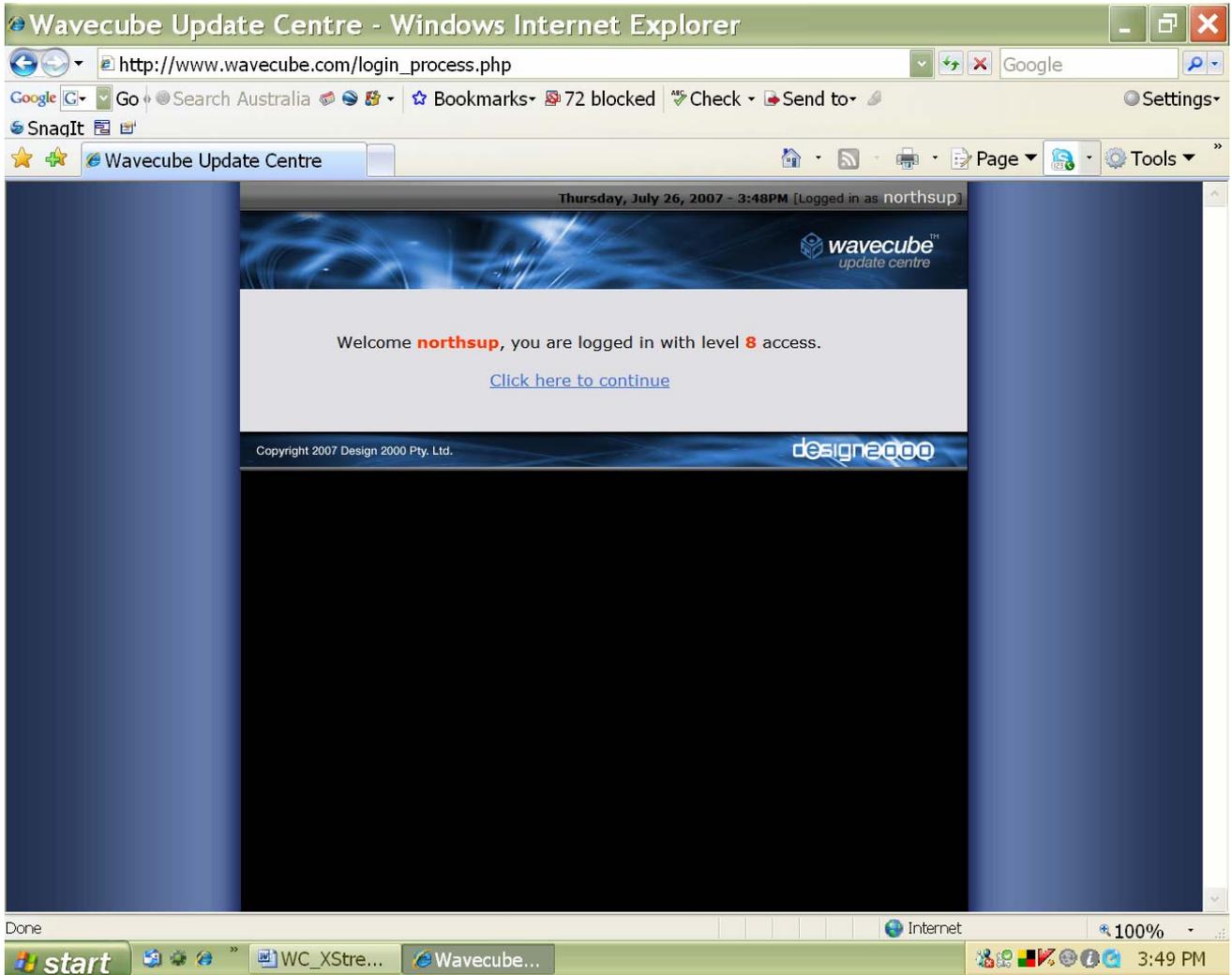
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7.   Uploading Message Updates to the WaveCube Update Centre

7.1   Logging in to the WaveCube Server

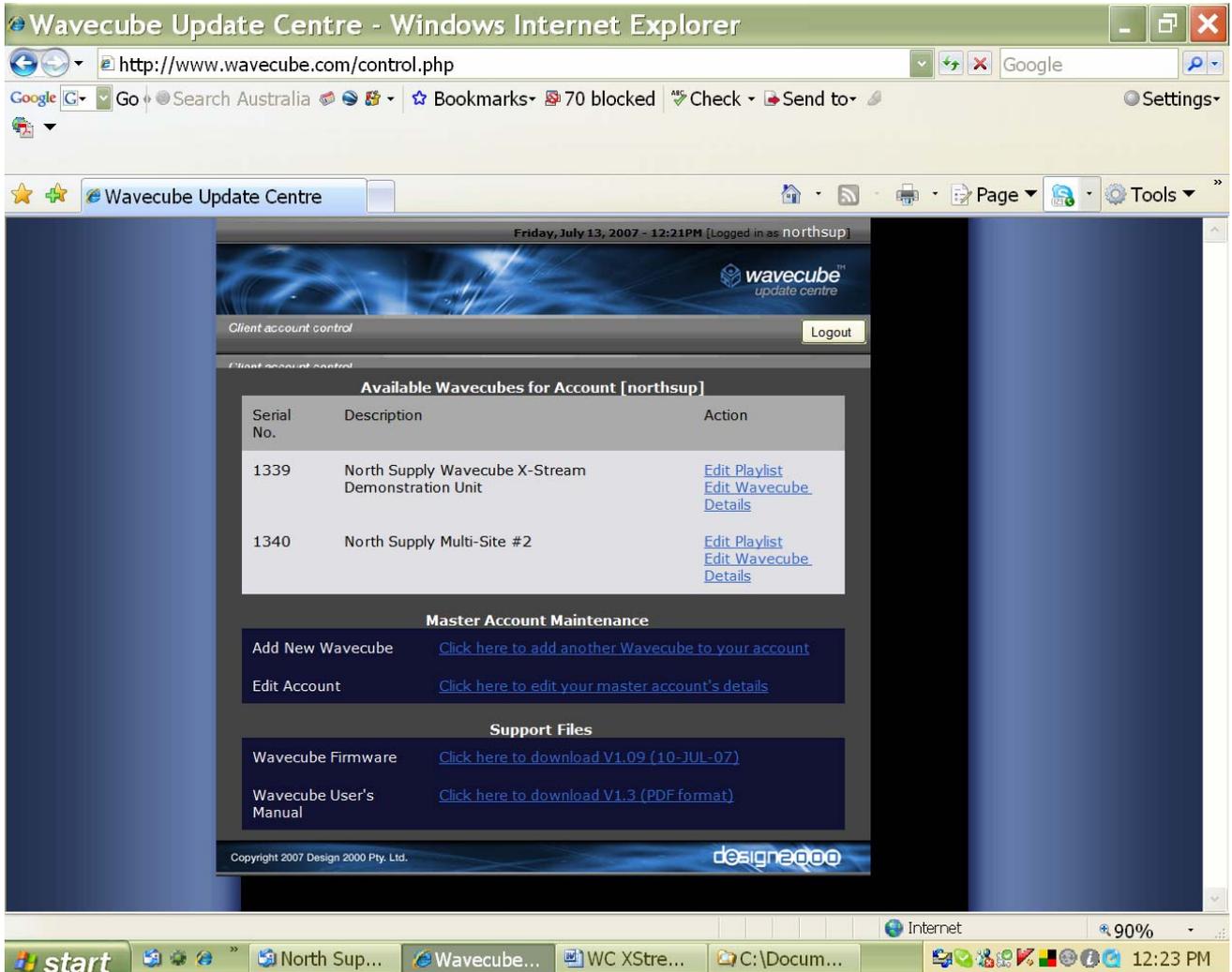Open Your Web Browser and enter www.wavecube.com/control.php to access the Update Centre as shown:
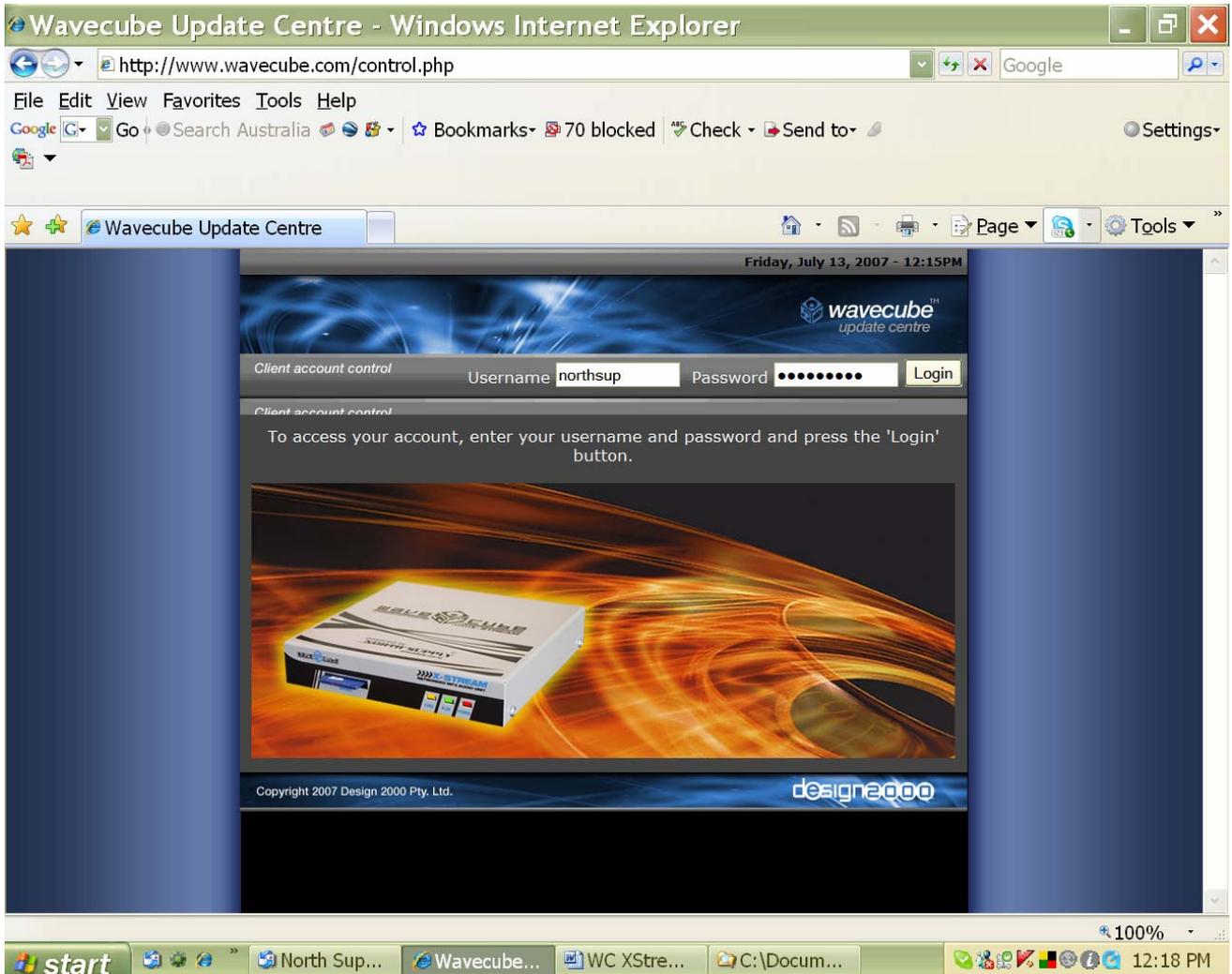
After entering your Username & Password, login and you'll see:
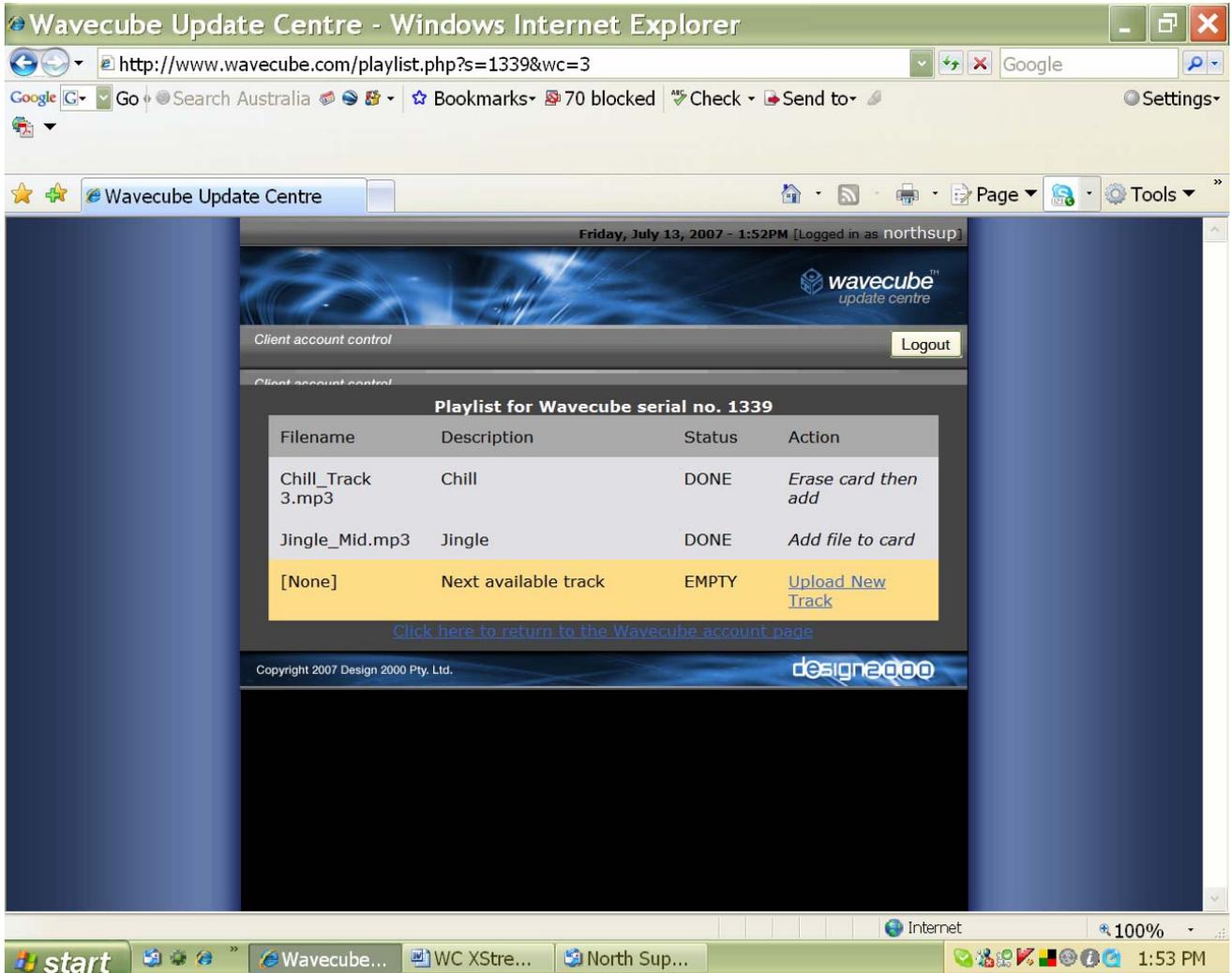

Then click on "Click here to continue"

After clicking on "Click here to continue" you'll see:

You can now choose to:

1. Edit the Playlist of any WaveCube X-stream in your account by clicking on Click on the appropriate 'Edit Playlist' shown on the previous page. You will see something like:

Note that if you see status "PENDING", it means that the file is in the queue and the **X-Stream** has not yet downloaded it.

To send the new MP3 file, click on "Upload New Track", browse your Computer to select the required track and you'll see:
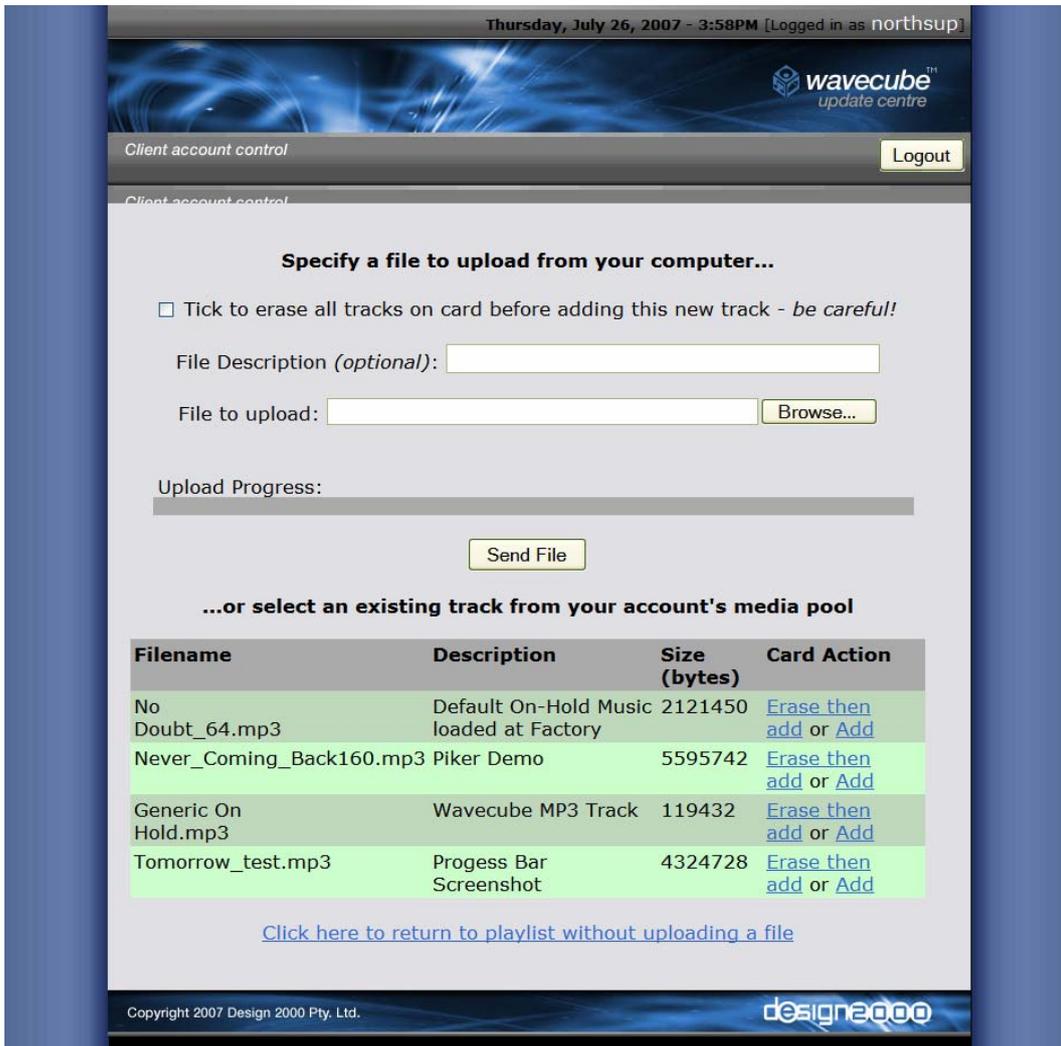

Tick the box **only if you want to erase & replace** the current files(s). If you do not tick the box, the new file will simply be added to the Playlist. You can also select a track from your Media Pool which is a copy of previously sent files. Click on "Send File" and the file will be uploaded to your account at the WaveCube update centre. The upload progress bar above the 'Send File' button will indicate sending progress.

NOTE: *If you wish to cancel the upload in progress, use the return link provided.*

Do NOT close the Update Centre window, or Logout, or use the back arrow during sending a file as this will inadvertently abort the upload. You can simply minimize the window and continue working on other tasks during the upload process.

The **X-Stream** will then download it when it next checks the WaveCube Server. You'll then receive an email download success notification from the WaveCube Auto-Mailer system.

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During the file upload process, you will see the Upload Progress bar as shown here:
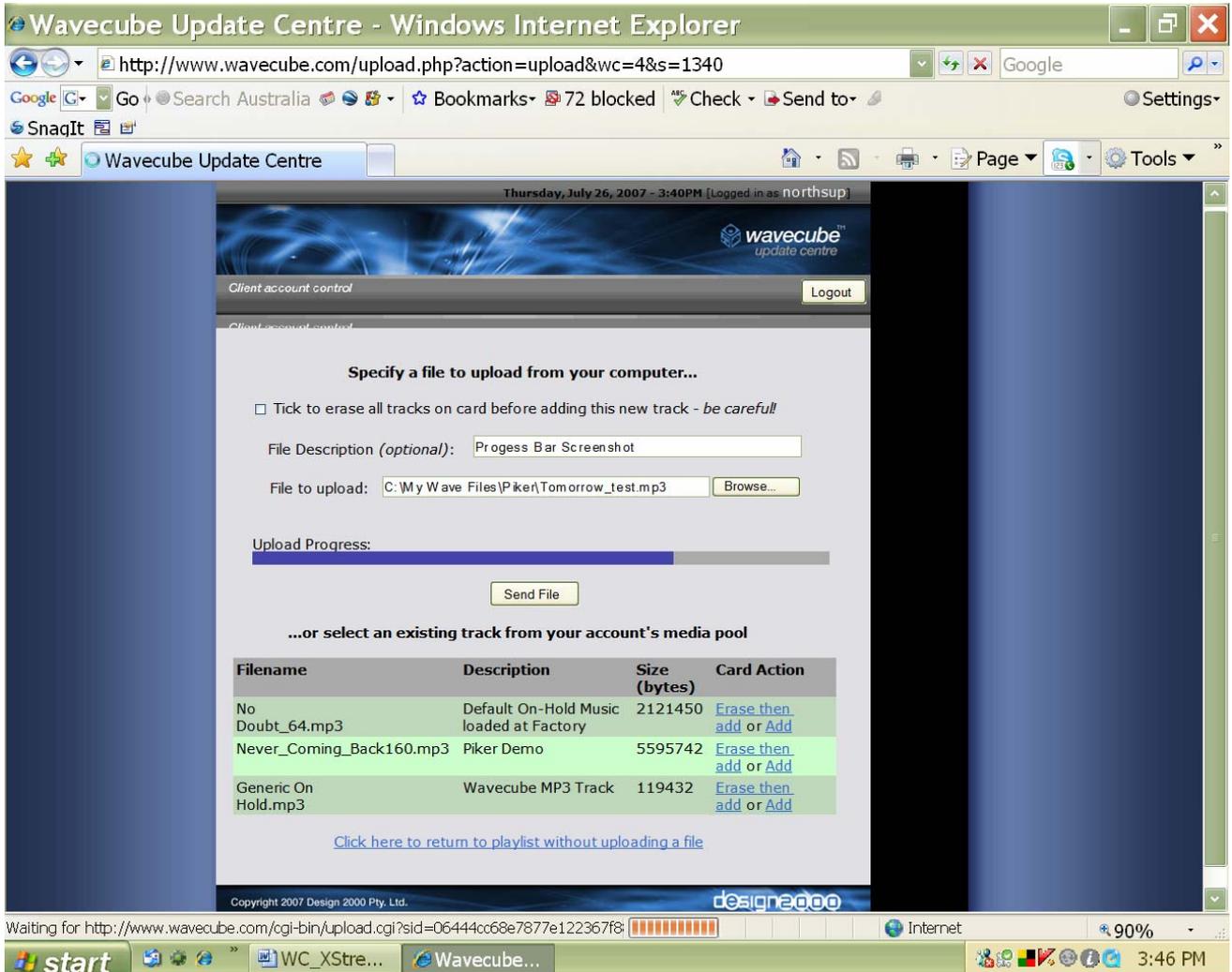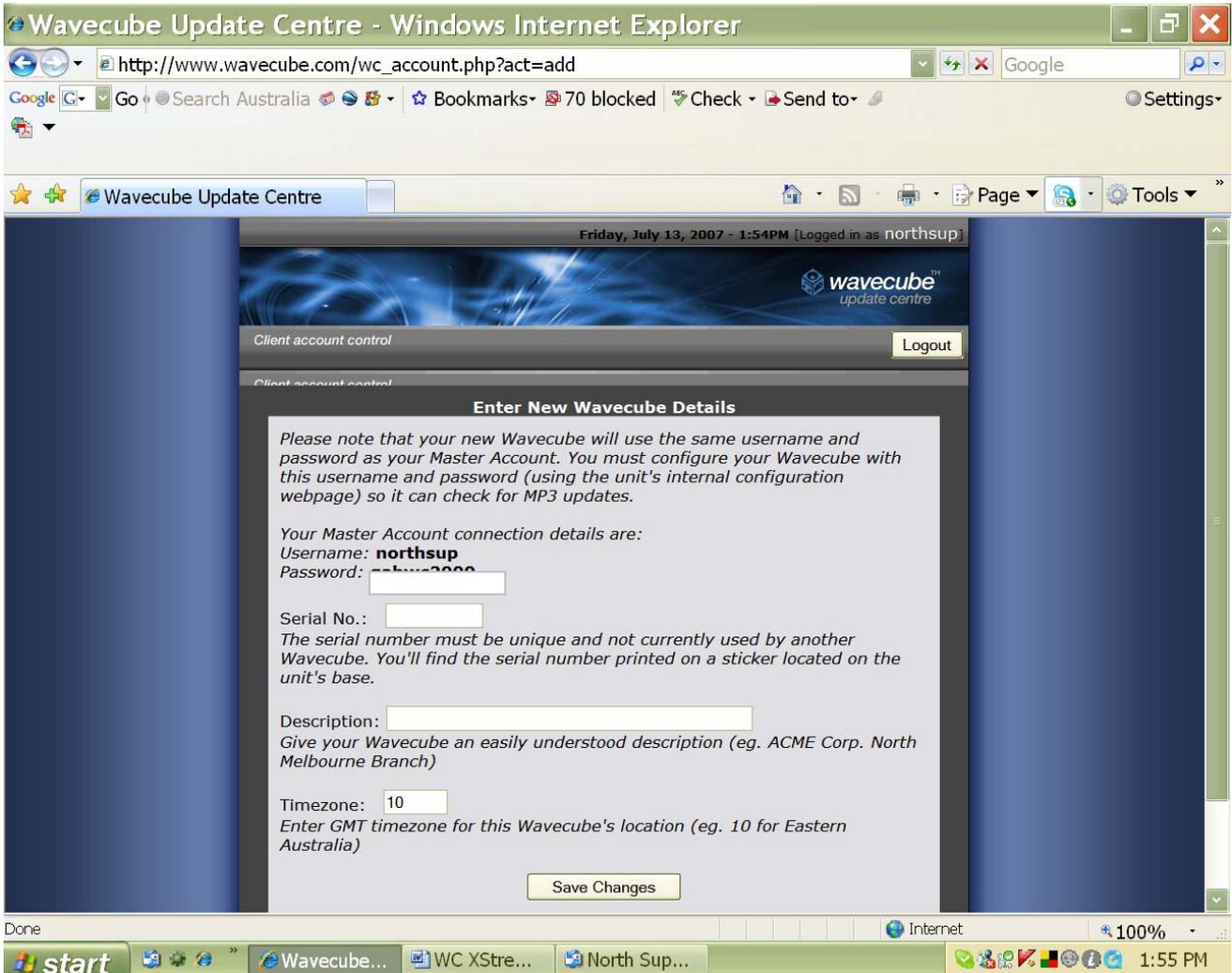
2. Edit the details of any WaveCube X-Stream in your account
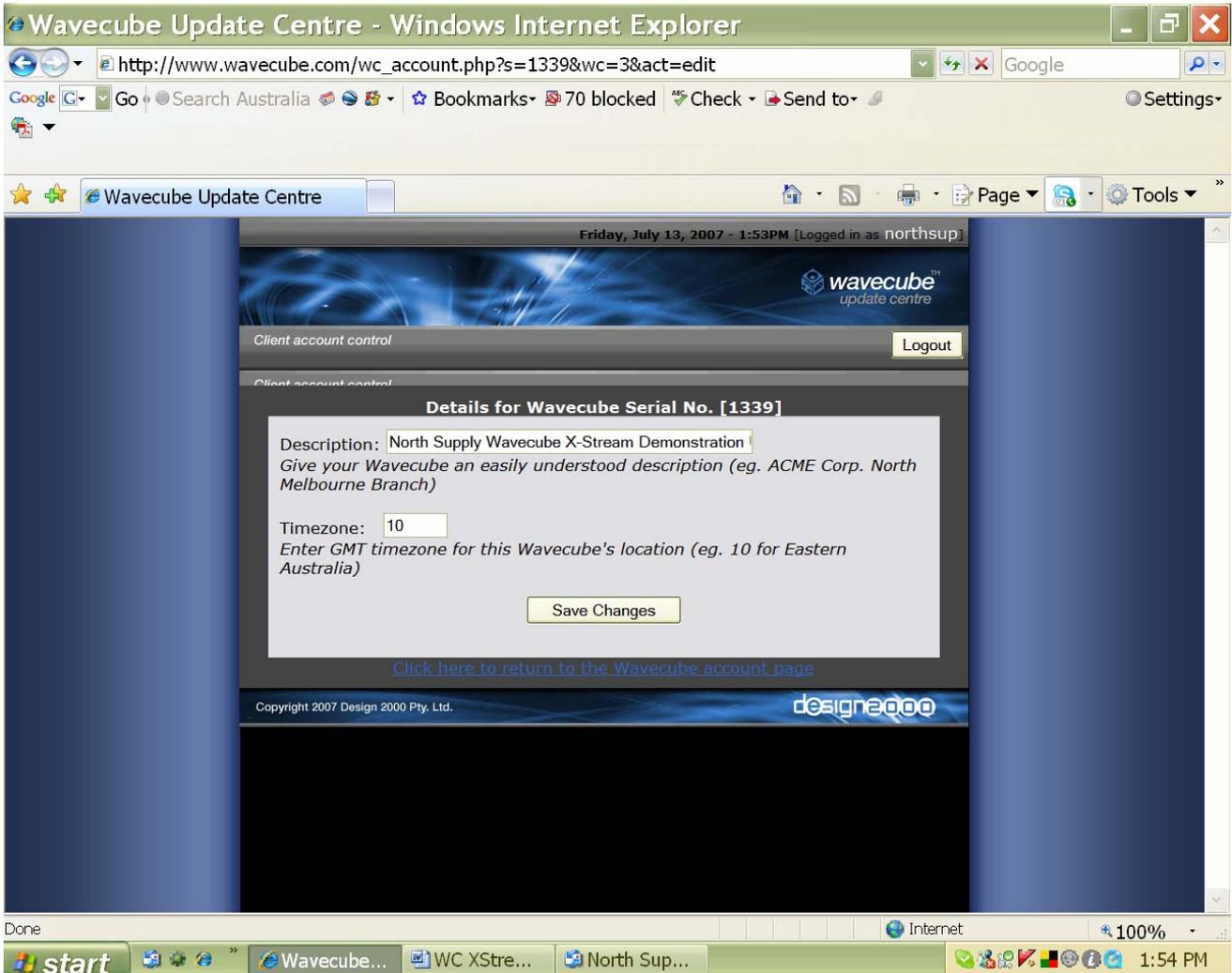
This page is used to name your WaveCube X-Stream and set the time zone. The correct time zone is essential for accurate time stamps in email update reports.
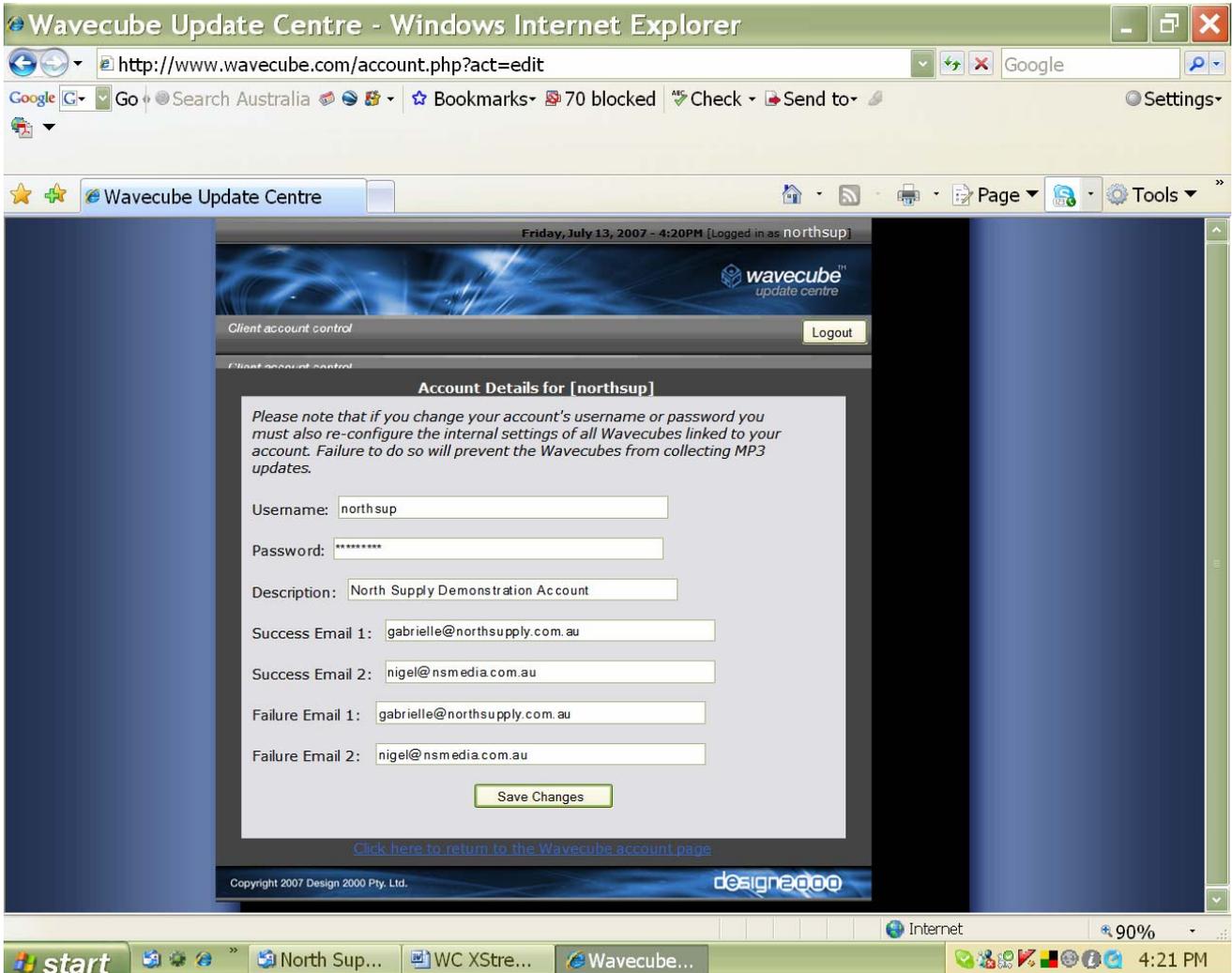
3. Add a new WaveCube X-Stream to your account

This page is used to add additional WaveCube X-Streams to your Master Account. Please note that your Password will be shown here. Additional Master accounts can be opened by contacting Design 2000 at gen@design2000.com.au.

4. Edit your account details

This page is used to change Username & Password, and to specify the email addresses that receive download success or failure confirmations. It is imperative that if you change your Username & Password here, you must also change it in your WaveCube X-stream (see **5.1.1 Local Configuration**) otherwise you will not receive any updates.

A typical email success notification is:

"*Wavecube X-Stream serial no.1338 (IP:203.214.59.118) successfully downloaded an MP3 named "Tomorrow_test.mp3" on Thursday, July 26, 2007 at 2:33PM. The total time taken to complete the download was 7 minutes, 44 seconds with an average transfer rate of 9320 bytes per second. There are now 0 file(s) remaining in the download queue. Note: This is an auto-generated email and cannot be replied to.*"

8.   Specifications

Indicators

Displays   Power LED (Red), Load LED (Yellow), Play LED (Green).

Message Upload/Playback

Message upload	Via scheduled online web updates or PC Card reader.
MP3 decoder	MPEG-1 Audio Layer 3 (ISO11172-3), supports MPEG 1 & 2 and 2.5 extensions.
Sample & bits rates	Mono or stereo.
MP3 Encode Rate	8 kbits/s to 320 kbits/s CBR (Constant Bit Rate), supports VBR (Variable Bit Rate) to a peak of 320 kbits/s.
Recommended MP3 bit rates	64 kbits/s mono for messages, ≥128 kbits/s for music.
Upper pass band	10 kHz.
Message retention	> 100 years.
Upload cycles	> 100, 000 writes to any one memory cell.
Read cycles	Unlimited.
Messages length	SD/MMC Card dependent, encode rate dependent.
Memory Card support	SD or MMC up to 1GB capacity, FAT16 (FAT) file system format.

Processor

Type PIC18F97J60	
Processor Speed	25 MHz XTAL, internally multiplied to 41.667 MHz.
On Board RAM	3.7KB.
On Board Ethernet Buffer	8KB.
On Board FLASH	128KB.
External EEPROM for settings and internal web page storage	32KB.

Back

Analogue Audio Out

Audio Out connectors	3.5 mm stereo phone jack for headphones/line out
	RJ-12 6P2C socket (isolated) for telephone line
Output level	< 4.4V p-p, 500mV p-p default (software adjustable)
Frequency range	40 Hz → 10 kHz (on stereo connector)
	300 Hz → 3.4 kHz (on telephone line socket)

Data Communication

Ethernet 10Mbps

External Control

PIR Detector input and regulated 12 Vdc output, used to trigger message start. The Sense Inputs can be configured as 3.3V Logic Outputs. It can also be configured as an RS232 diagnostic port.

EXTERNAL CONTROL CONNECTIONS
(IF FITTED)

PIN NO.	FUNCTION	SPEC.
1	+VE SUPPLY OUT	12V DC 100mA MAX OUT
2	-VE SUPPLY OUT	SUPPLY RETURN
3	SENSE 1 IN	SENSE TO PIN 5
4	SENSE 2 IN	SENSE TO PIN 5
5	GROUND	SENSE RETURN

EXTERNAL RS232 CONNECTIONS
(IF FITTED)

PIN NO.	FUNCTION	SPEC.
1	NC	NO CONNECTION
2	GROUND	
3	RxD	DATA TO WX-5095
4	TxD	DATA FROM WX-5095
5	GROUND	(DATA RETURN)

Power

Power requirement	12Vdc 300mA, centre positive
Current draw	230 mA downloading, 250 mA playback
Power connector	2.1 mm concentric

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General

Enclosure	
Material	Powder coated Zincalume
Dimensions	25 mm x 130 mm x 130 mm
Operating Environment	
Operating Temperature Range	-10 $\rightarrow$ +60 ° C
Storage Temperature Range	-20 $\rightarrow$ 80 ° C ambient
Humidity, Storage and Operating	To 98% non-condensing
Mean Time Between Failure	> 20 years
General	
Included software	Supporting material
Electrical Safety / Isolation	Complies to ACMA TS001, AS/NZS 3260, AS/NZS 60950
EMC Compliance	AS/NZS CISPR22:2004
NZ Telepermit	PTC 212/92/005
ACMA Supplier's Code Number	N468
Warranty	Two years

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9.   Acronyms

Account Name	Same as your Username
Account No.	Same as the first **X-Stream** serial number in your account
COM Port	RS232 Communication port on a PC, sadly disappearing on most home office PCs
CD	Compact Disk
CE	Customer Equipment (eg. **X-Stream**)
DCE	Data Communication Equipment (eg. **X-Stream**)
DTE	Data Terminal Equipment (eg. PC)
DVD	Digital Versatile Disc
Ethernet	A frame-based computer networking technology that operates at 10/100 Mbit/s for local area networks
FTP	File Transfer Protocol, used to transfer data from one computer to another over the Internet, or through an Ethernet network.
HTTP	Hypertext Transfer Protocol used to transfer or convey information on the World Wide Web
LAN	Local Area Network, a computer network covering a small geographic area, like a home, office, or group of buildings, most likely based on switched IEEE 802.3 Ethernet technology
LIU	Line Isolation Unit, provides electrical isolation between CE and a telephone system
mA	Milliamps
MAC Address	Media Access Control address is a unique identifier of a computer networking device
Mbps	Mega (million) bits per second
Media Pool	A copy of files uploaded to your account.
MMC	Multi Media Card, a small card based data storage medium
MOH	Music On Hold
MP3	Moving Picture Experts Group (MPEG)-1, Audio Layer 3
Password	Used (with your Username) to access your WaveCube account
PC	Personal Computer, or Potato Cake (in Melbourne)
PIR	Passive Infrared Detector, a common type of motion detector used in security alarm systems.
POP Server	Post Office Protocol Server
RS232	Recommended Standard number 232 for connecting DTE & DCE data communication devices.
SD Card	Secure Digital Card, a small card based data storage medium
Serial	Another name for RS232, although not limited to this
SMTP Server	Simple Mail Transfer Protocol Server
SOHO	Small Office/Home Office
USB	Symbolized by ⟜⟞ Universal Serial Bus, a serial communications computer bus to interface devices
User	User Account details
Username	Used (with your Password) to access your WaveCube account
VoIP	Voice over Internet Protocol. This is packet switched voice rather than circuit switched voice.
WAN	Wide Area Network, a computer network that covers a broad area whose communications links cross metropolitan, regional, or national boundaries

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X-Stream WX-5095
MP3 ON-HOLD PLAYER

Note: Specifications are subject to change without notice.

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