

BBC Wales AUDIO DIGITIZATION – BISA 2018

BBC CYMRU WALES ARCHIVE

British Broadcasting Company was established in 1922

BBC's first broadcast from Wales – 13th Feb 1923

No recordings from early years – all broadcast live

Scripts and programme schedules/running orders have survived

CREATIVE
NATION
CYMRU
GREADIGOL



BBC | cymru
wales

BBC CYMRU WALES' ARCHIVE

WW2 – reporting the conflict on radio

BBC's Light Entertainment moved from London to Bangor

Early content includes:

- Radio plays
- Education and schools programmes
- News and sport



CREATIVE
NATION
CYMRU
GREADIGOL

BBC | cymru
wales

CREATIVE
NATION
CYMRU
GREADIGOL



BBC | cymru
wales

1950's, 1960's, 1970's

Output expanded to include all genres to provide a wide range of information, education and entertainment

Broadcast in English and Welsh on radio and TV

Radio Wales and Radio Cymru – launched in 1978

Collection now forms a valuable record of people's lives, culture, traditions and interests of the people of Wales

BROADCAST LANDSCAPE IN WALES 1980'S, 1990, 2000

BBC Wales – funded through the licence fee

ITV Wales – commercially funded

S4C – Welsh language channel launched in 1982

HOW ARCHIVE IS USED

BBC productions – internal use for public service programmes

BBC Studios and Independent Companies – external use for public service broadcast

Commercial exploitation – licensed to production companies for other broadcasters/corporate use

BBC Wales/S4C archive agreement

THE PRESENT

BBC Wales is relocating to a new building in 2019

Co-locating with S4C

Providing playout, technology and archive services

New building has smaller footprint

Significant investment to digitise BBC Wales archive holdings

S4C digitising their collections separately

BBC WALES CENTRAL SQUARE



ARCHIVE PREPARATIONS FOR THE MOVE

90 years' worth of content doesn't move
itself...!

CREATIVE
NATION
CYMRU
GREADIGOL

BBC | cymru
wales

AV & AUDIO DIGITIZATION

64,500 AV tapes digitised (Beta SP, Beta SX, Digibeta and HD formats)

97,000 audio assets (1/4", DATs, minidiscs, CDs)

Digital files ingested into BBC Digital Archive/Radio Digital Archive

Digitization for access, not for preservation

Minimum/existing metadata for digitization/ingest

Format conversion only – no metadata enhancement

FILM DIGITIZATION

13,000 film cans

Approximately 75% transferred to tape

Plan A - relocation

Plan B – digitization

1300 hours/75 hours per month

Early news and sport – complete by October 2019

THERE'S STILL MUCH TO DO...

Appraisal/selection/digitization

Production Files - 1548 boxes

Corporate Archive – 107 boxes

Stills collection – mix of copyright

AV rushes

Decommissioning/donation/disposal of assets
in line with policy

BBC Archives

Securing the past for the future

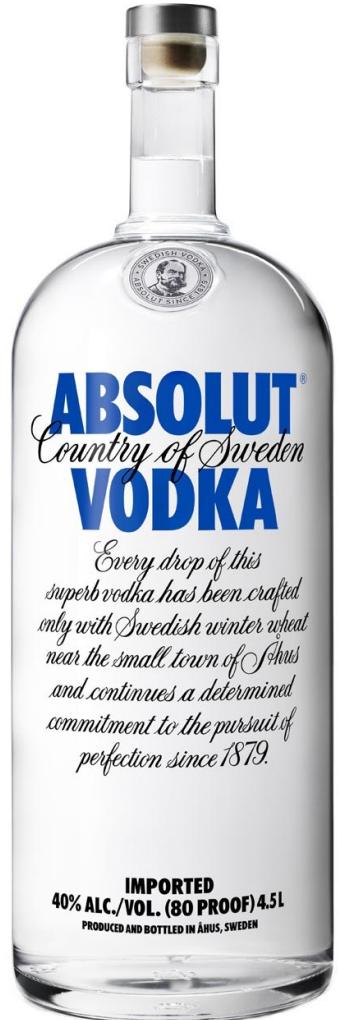








CONSTANT
RECORD

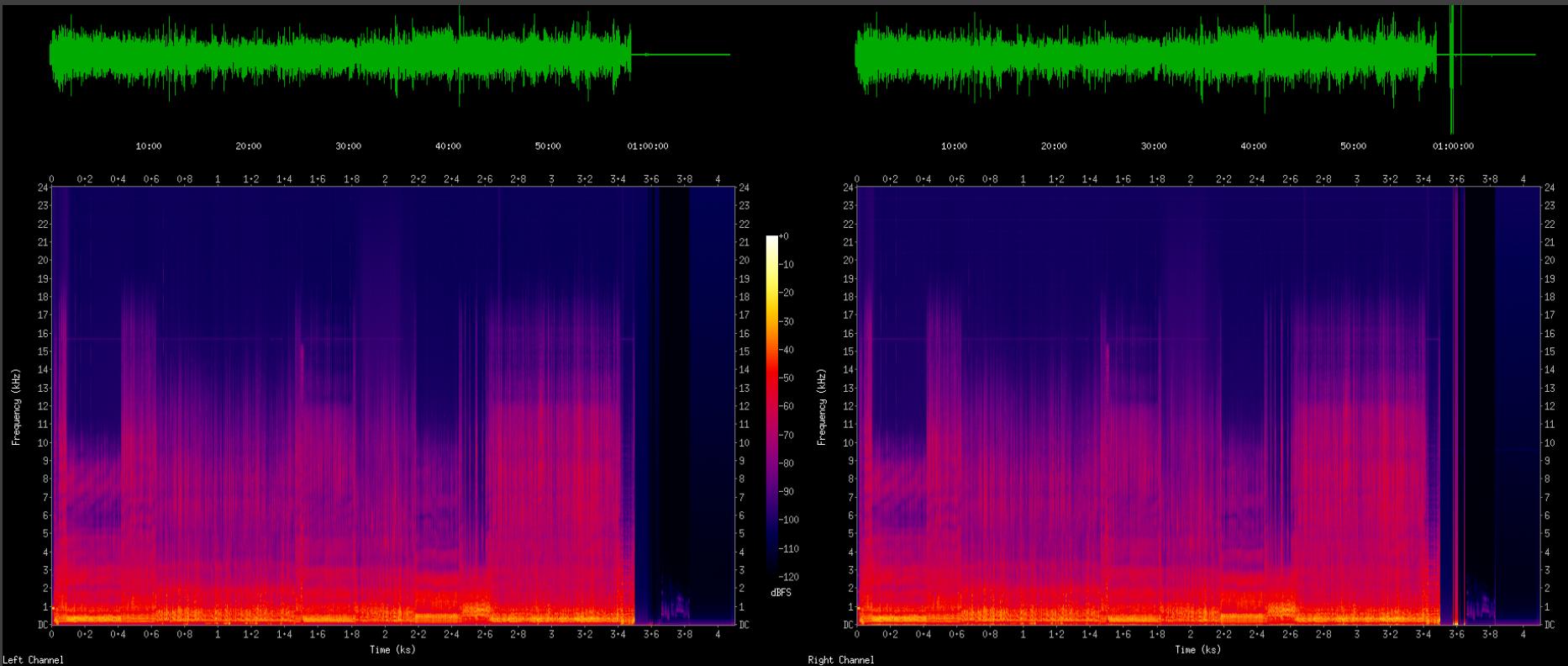


ASSETS

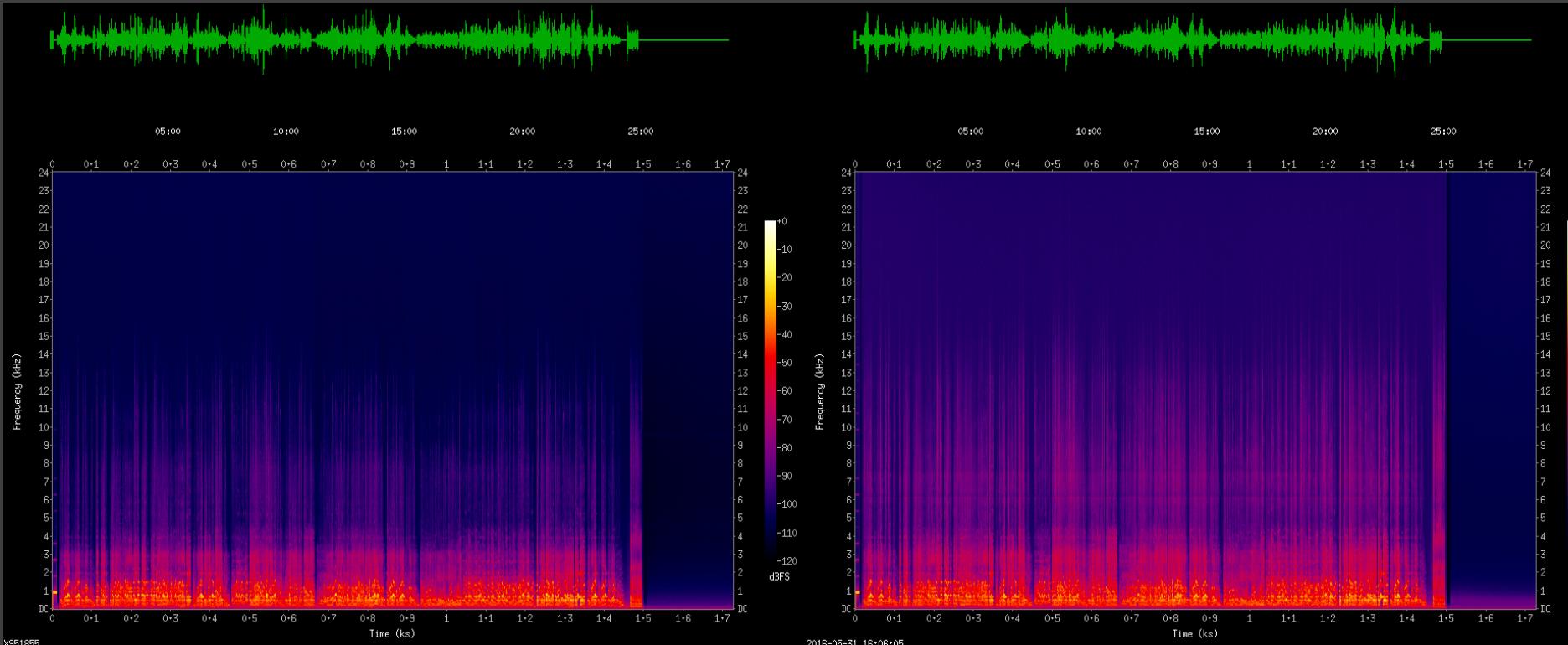
ASSETS
HOURS

ASSETS
HOURS
TONNES

SOX : FFT



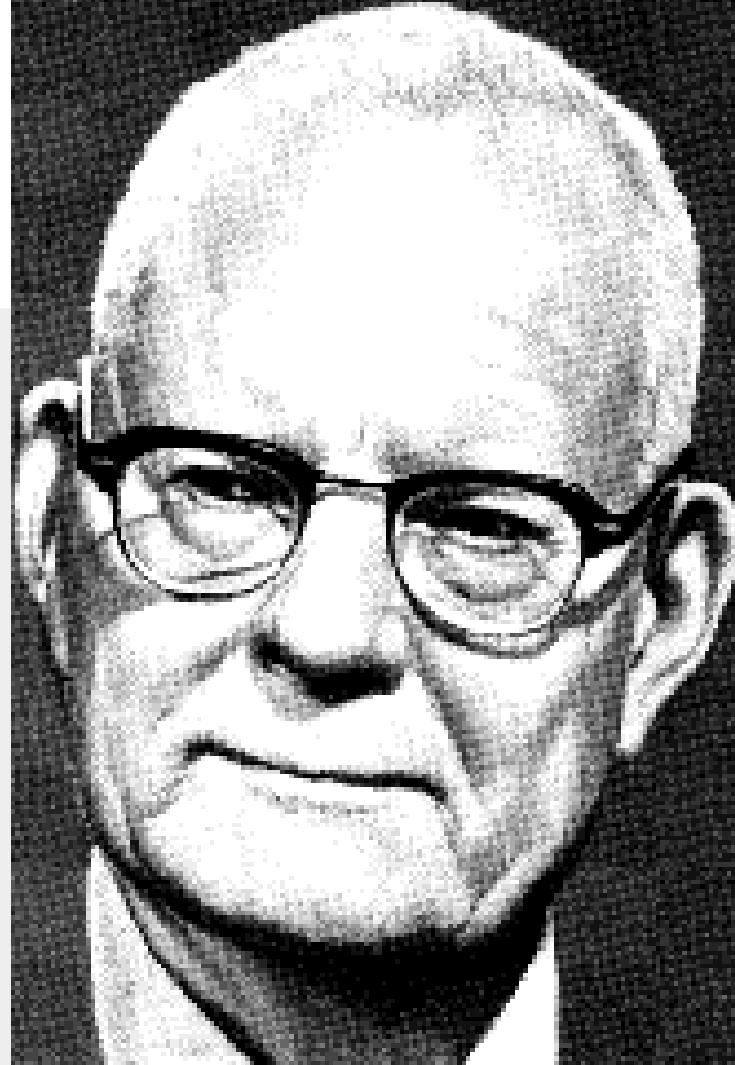
SOX: FFT



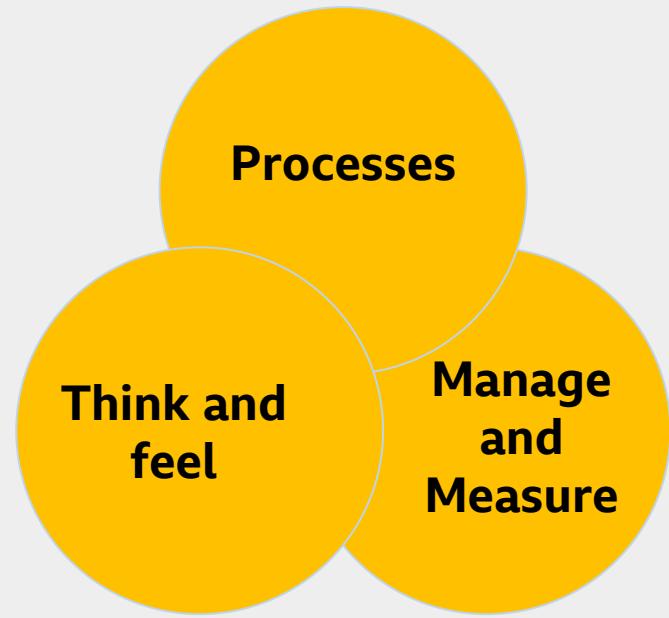


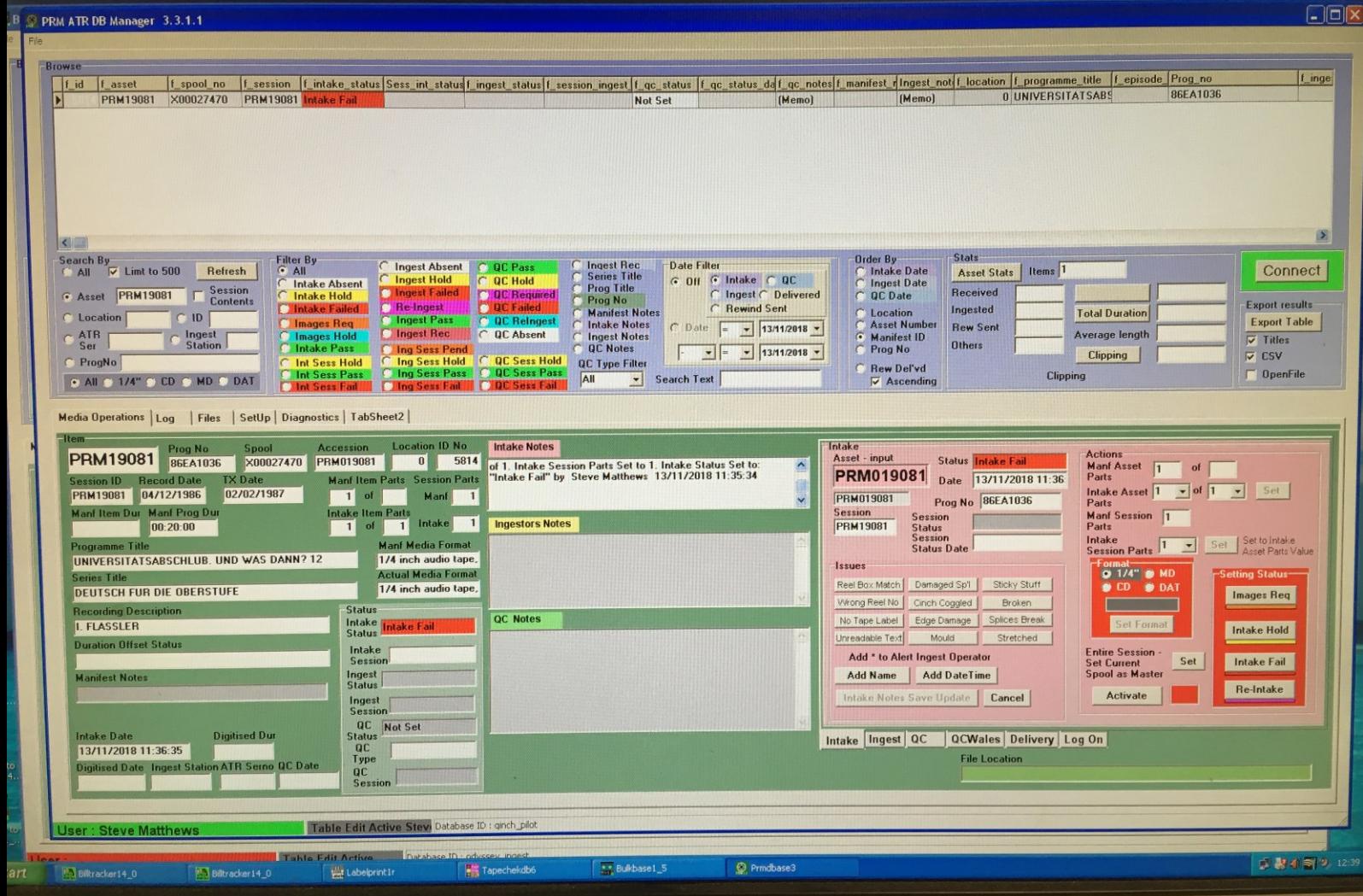
**“Without data
you’re just another
person with an
opinion”**

W. Edwards Deming



FACTORY - LEAN





Intake Asset - input PRM019081		Status Intake Fail Date 13/11/2018 11:36	Actions Manf Asset Parts 1 of 1 Intake Asset Parts 1 of 1 Set Manf Session Parts 1 Intake Session Parts 1 Set Set to Intake Asset Parts Value												
Session PRM19081		Prog No 86EA1036 Session Status Session Status Date	Format <input checked="" type="radio"/> 1/4" <input type="radio"/> MD <input type="radio"/> CD <input type="radio"/> DAT Set Format												
Issues <table border="1"> <tr> <td>Reel Box Match</td> <td>Damaged Sp'l</td> <td>Sticky Stuff</td> </tr> <tr> <td>Wrong Reel No</td> <td>Cinch Cogged</td> <td>Broken</td> </tr> <tr> <td>No Tape Label</td> <td>Edge Damage</td> <td>Splices Break</td> </tr> <tr> <td>Unreadable Text</td> <td>Mould</td> <td>Stretched</td> </tr> </table>				Reel Box Match	Damaged Sp'l	Sticky Stuff	Wrong Reel No	Cinch Cogged	Broken	No Tape Label	Edge Damage	Splices Break	Unreadable Text	Mould	Stretched
Reel Box Match	Damaged Sp'l	Sticky Stuff													
Wrong Reel No	Cinch Cogged	Broken													
No Tape Label	Edge Damage	Splices Break													
Unreadable Text	Mould	Stretched													
Add * to Alert Ingest Operator Add Name Add DateTime															
Intake Notes		Save Update	Activate Set												
Setting Status <table border="1"> <tr> <td>Images Req</td> </tr> <tr> <td>Intake Hold</td> </tr> <tr> <td>Intake Fail</td> </tr> <tr> <td>Re-Intake</td> </tr> </table>				Images Req	Intake Hold	Intake Fail	Re-Intake								
Images Req															
Intake Hold															
Intake Fail															
Re-Intake															

HP UP2427w

BBC Recorder BBC Recorder BBC Recorder BBC Recorder BBC Recorder

RecAudArc... RecAudArc... RecAudArc... RecAudArc... RecAudArc... RecAudArc...

- Shortcut - Shortcut - Shortcut - Shortcut - Shortcut - Shortcut

Recycle Bin

Archive Audio Recorder - Channel 1 V1_4_0_1

Ingest | Setup | Ingest Control

New/Open Tape No. PRM009120

LU Yes LU No Pass ATR 001595

7.5 ips 15 ips REC

Record Stop Reset Fail Re-Ing Remote

Timer 0 30Mns 60Mns

Title MIND IN SCIENCE Status Tape / Ses

Series MIND IN SCIENCE Ingest Rec

Manifest Duration 00:00:00 Prog No 3906934 QC Status Not Set

Issues Session / Parts

Reel Box Id Err Low Level Brown Shed

Damaged Spt High Level Black Shed

Splices Break Distorted White Shed

Broken Auffed HF Loss Sticky Shed

Stretched Dropout Loose Shed

Cressing Oxide Loss Skews or Stop

Edge Damage Unstable Tone Squealing

1 of 1 Insert Timer TT

Ingestor's Notes

Intake Notes Save Cancel

Part 1 of 1 Intake Session Parts Set to 1 Intake Status Set to "Images Rec" by Marco Leiva 22/10/2018 16:21:26

QC Notes

LogOn LogOff

Open Web Browser

Archive Audio Recorder - Channel 2 V1_4_0_1

Ingest | Setup | Ingest Control

New/Open Tape No. PRM009119

LU Yes LU No Pass ATR 001595

7.5 ips 15 ips REC

Record Stop Reset Fail Re-Ing Remote

Timer 0 30Mns 60Mns

Title PART 6 Status Tape / Ses

Series SKWALKS WITH MIKE HARDING Ingest Rec

Manifest Duration 00:00:00 Prog No 577AB9 QC Status Not Set

Issues Session / Parts

Reel Box Id Err Low Level Brown Shed

Damaged Spt High Level Black Shed

Splices Break Distorted White Shed

Broken Auffed HF Loss Sticky Shed

Stretched Dropout Loose Shed

Cressing Oxide Loss Skews or Stop

Edge Damage Unstable Tone Squealing

1 of 1 Insert Timer TT

Ingestor's Notes

Intake Notes Save Cancel

Part 1 of 1 Intake Session Parts Set to 1 Intake Status Set to "Images Rec" by Pete Wilkinson 22/10/2018 15:18:40

QC Notes

LogOn LogOff

Archive Audio Recorder - Channel 3 V1_4_0_1

Ingest | Setup | Ingest Control

New/Open Tape No. PRM009755

LU Yes LU No Pass ATR 001595

7.5 ips 15 ips REC

Record Stop Reset Fail Re-Ing Remote

Timer 0 30Mns 60Mns

Title LISTENING CORNER Status Tape / Ses

Series LISTENING CORNER Ingest Rec

Manifest Duration 00:00:00 Prog No 463/663 QC Status Not Set

Issues Session / Parts

Reel Box Id Err Low Level Brown Shed

Damaged Spt High Level Black Shed

Splices Break Distorted White Shed

Broken Auffed HF Loss Sticky Shed

Stretched Dropout Loose Shed

Cressing Oxide Loss Skews or Stop

Edge Damage Unstable Tone Squealing

1 of 1 Insert Timer TT

Ingestor's Notes

Intake Notes Save Cancel

Part 1 of 1 Intake Session Parts Set to 1 Intake Status Set to "Images Rec" by Pete Wilkinson 22/10/2018 15:25:59

QC Notes

LogOn LogOff

Archive Audio Recorder - Channel 4 V1_4_0_1

Ingest | Setup | Ingest Control

New/Open Tape No. PRM009756

LU Yes LU No Pass ATR 001595

7.5 ips 15 ips REC

Record Stop Reset Fail Re-Ing Remote

Timer 0 30Mns 60Mns

Title RIG AND LITTLE (PART 1) SERIES NO. Status Tape / Ses

Series LISTENING CORNER Ingest Rec

Manifest Duration 00:00:00 Prog No 463/660 QC Status Not Set

Issues Session / Parts

Reel Box Id Err Low Level Brown Shed

Damaged Spt High Level Black Shed

Splices Break Distorted White Shed

Broken Auffed HF Loss Sticky Shed

Stretched Dropout Loose Shed

Cressing Oxide Loss Skews or Stop

Edge Damage Unstable Tone Squealing

1 of 1 Insert Timer TT

Ingestor's Notes

Intake Notes Save Cancel

Part 1 of 1 Intake Session Parts Set to 1 Intake Status Set to "Images Rec" by Pete Wilkinson 22/10/2018 15:25:33

QC Notes

LogOn LogOff

Archive Audio Recorder - Channel 5 V1_4_0_1

Ingest | Setup | Ingest Control

New/Open Tape No. PRM009455

LU Yes LU No Pass ATR 001595

7.5 ips 15 ips REC

Record Stop Reset Fail Re-Ing Remote

Timer 0 30Mns 60Mns

Title GRANTHAM Status Tape / Ses

Series FAT MAN OUT Ingest Rec

Manifest Duration 00:00:00 Prog No 360/080 QC Status Not Set

Issues Session / Parts

Reel Box Id Err Low Level Brown Shed

Damaged Spt High Level Black Shed

Splices Break Distorted White Shed

Broken Auffed HF Loss Sticky Shed

Stretched Dropout Loose Shed

Cressing Oxide Loss Skews or Stop

Edge Damage Unstable Tone Squealing

1 of 1 Insert Timer TT

Ingestor's Notes

Intake Notes Save Cancel

Part 1 of 1 Intake Session Parts Set to 1 Intake Status Set to "Images Rec" by Mark Osborn 23/10/2018 10:45:51

QC Notes

LogOn LogOff

File setup

B Control Options Channels Find & Play Sure

Channel 1 0:26:19

Channel 2 0:26:20

Channel 3 0:26:20

Channel 4 0:25:53

Channel 5 0:25:53

1:17:56 Process & Compress File Complete ([110 100 19 73 projects\ArchAudio\Ingest\PRM009120.ing wav]

12:13:04 Record started: PRM009755.ing wav

12:13:05 Record started: PRM009756.ing wav

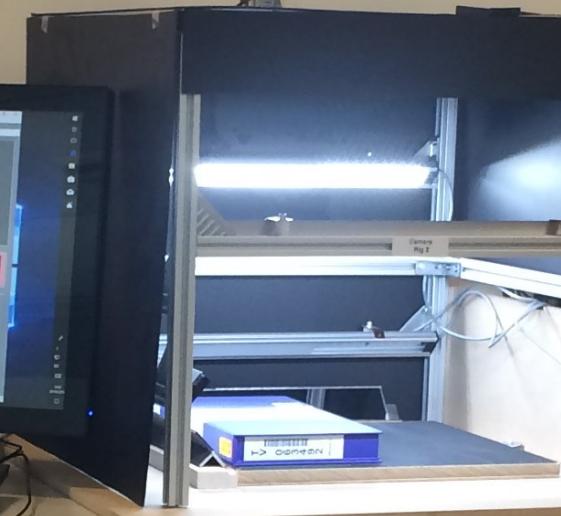
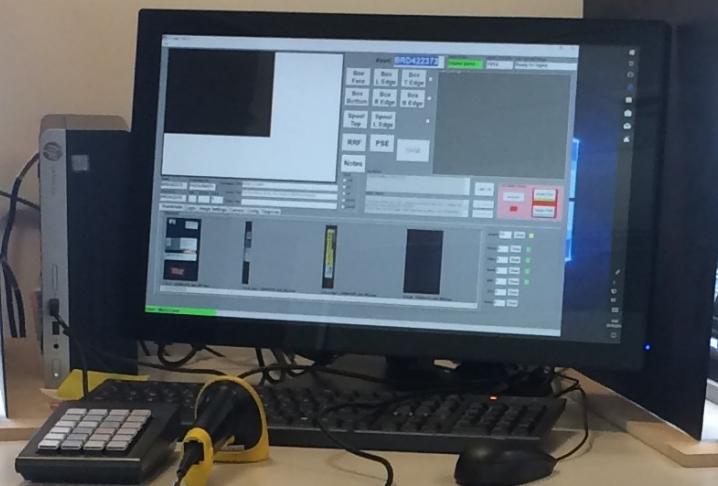
12:13:06 Record started: PRM009120.ing wav

12:13:07 Record started: PRM009756.ing wav

12:13:11 Record started: PRM009455.ing wav

Title		LISTENING CORNER		Status: Tape / Sess																					
Series		LISTENING CORNER		Ingest Rec																					
Manifest	Duration	00:00:00	Prog No	469J663																					
				QC Status																					
				Not Set																					
Issues: <table border="1"> <tr> <td>Reel Box Id Er</td> <td>Low Level</td> <td>Brown Shed</td> </tr> <tr> <td>Damaged Sp'l</td> <td>High Level</td> <td>Black Shed</td> </tr> <tr> <td>Splices Break</td> <td>Distorted</td> <td>White Shed</td> </tr> <tr> <td>Broken</td> <td>Muffled HF Loss</td> <td>Sticky Shed</td> </tr> <tr> <td>Stretched</td> <td>Dropout</td> <td>Loose Shed</td> </tr> <tr> <td>Creasing</td> <td>Oxide Loss</td> <td>Slows or Stops</td> </tr> <tr> <td>Edge Damage</td> <td>Unstable Tone</td> <td>Squealing</td> </tr> </table>					Reel Box Id Er	Low Level	Brown Shed	Damaged Sp'l	High Level	Black Shed	Splices Break	Distorted	White Shed	Broken	Muffled HF Loss	Sticky Shed	Stretched	Dropout	Loose Shed	Creasing	Oxide Loss	Slows or Stops	Edge Damage	Unstable Tone	Squealing
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Session / Parts <table border="1"> <tr> <td>PRM9755</td> <td></td> </tr> <tr> <td>1</td> <td>of</td> <td>1</td> </tr> <tr> <td colspan="3">Insert Timer TT</td> </tr> </table>					PRM9755		1	of	1	Insert Timer TT															
PRM9755																									
1	of	1																							
Insert Timer TT																									
Ingestor's Notes																									

PHYSICAL SCANNING





BARCODES





RECORD 1

COMMENT 1

DELETE

CANCEL

STOP 1

COMPLETE 1

INGESTED

INGESTED

INGESTED

↑ 91-1-05

↑ 91-1-04

↑ 91-1-03

205
Rack
90

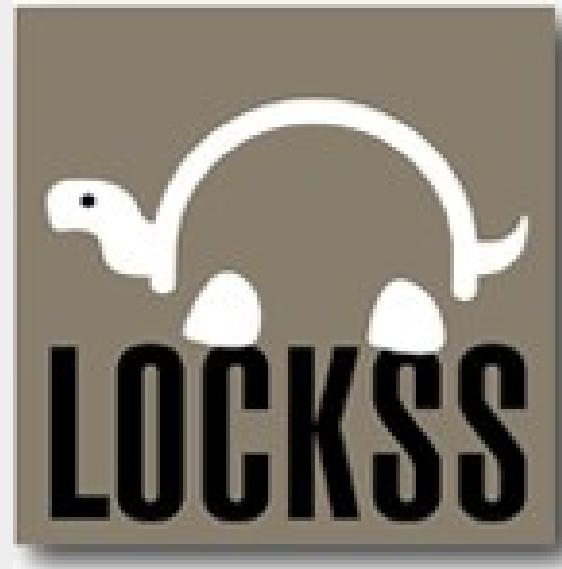
Rack
91

CAUTION
SHIPPING
NAME

Medium	Storage Density (bits/cm ²)	Lifespan (years)
Stone	10	10,000
Paper	10,000	1000
Film	10,000,000	100
Disc	10,000,000,000	10

"Preserving Moving Pictures and Sound" Wright 2012

LOTS
OF
COPIES
KEEP
STUFF
SAFE



DIGITAL STORAGE

Assume an imperfect carrier

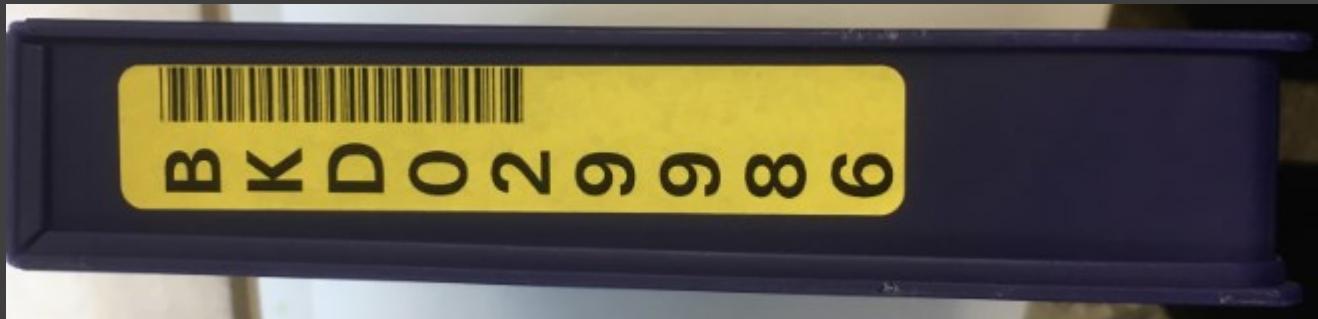
- If it moves, Checksum it
- If it doesn't move, Checksum it

FILENAMES



`BKD029986.wav`

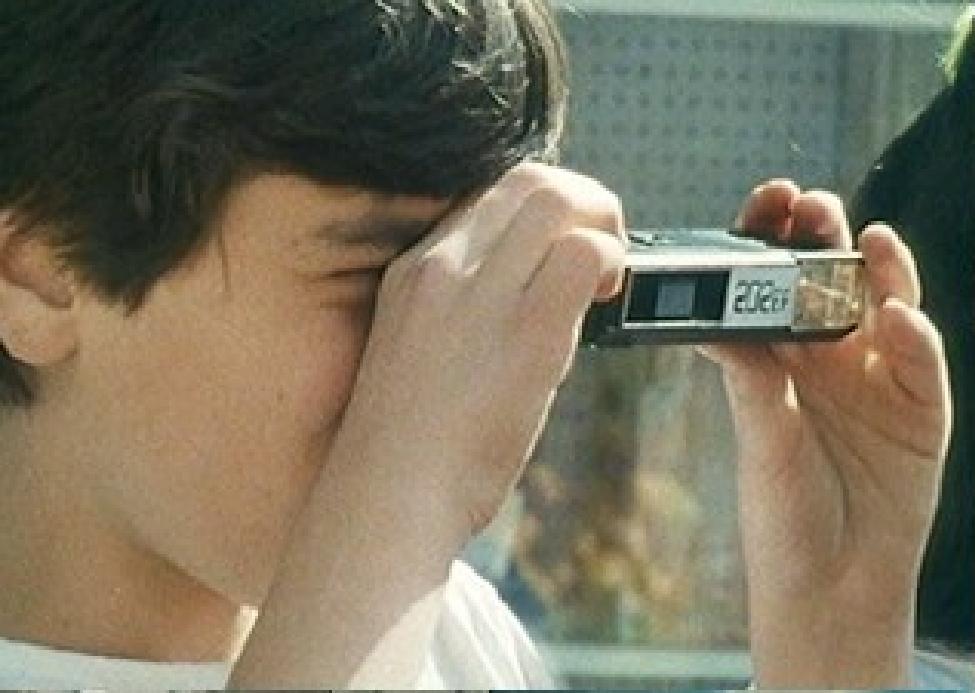
FILENAMES



BKD029986_79054025255fb1a26e4bc422aef54eb4.wav



Exit



Turn left

Forward

Turn right

The Domesday Gallery



Help

Plan

Area

Move

Contents

Find



LONG TERM



LONG TERM

Approach

The digitisation of selected videotapes will be carried out at BBC Archives' Odyssey Park facility in South Ruislip using workflow systems built in-house by BBC Archives. These use Telestream Lightspeed units to create the uncompressed master files, and FFMBC to create IMX50 files from these, which are then re-wrapped to AS11 DPP files using bmxtranswap.

BBC Archives have committed to a 'touch once' approach to the digitisation of these assets. This means each videotape digitisation should produce:

- A preservation quality digital copy of the videotape as Uncompressed 10-bit YUV 720x576 (v210) Quicktime (MOV) file with four 48kHz 24-bit uncompressed audio tracks. These uncompressed files are only stored on these LTO tapes.
- A broadcast quality digital copy of the videotape as an AS11 DPP MXF (720x608 IMX/D10 50Mbps with four channel 48KHz 24-bit audio) which will be imported to the BBC's Digital Archive (VizRT's Viz One MAM) resulting in these files being stored to a 2+1 storage level.
- Accompanying digital images of the physical asset, its packaging and any related VTR documentation that was enclosed within.

Clipping

The AS11 DPP MXF file will be clipped where possible to remove trailing black (or grey) and silence (with a 15 second handle) in order to minimise wastage of storage space in the BBC Digital Archive.

for the given track. This checksum was produced by mxf2raw during extraction of the MXF file from LTO tape. The values of these checksums are not stored inside the MXF file.

This XML document was produced by analysing [`D__37150401-LTA00089207.mxf.full_mxf_analysis.xml`](#).

D__37150401-LTA00089207.mxf.full_mxf_analysis.xml

This XML file contains the full details produced by using mxf2raw to analyse the MXF file. Also refer to the summarised version of this XML file and its explanation.

D__37150401-LTA00089207.mxf.md5

This file contains the MD5 checksum for the entire MXF file. This checksum was produced by mxf2raw during extraction of the MXF file from LTO tape. This means that it was produced by the same process that was also fully reading (and partially verifying) the MXF file. This checksum also appears in the XML files included in this collection.

D__37150401-LTA00089207.mxf.sha1

This file contains the SHA-1 checksum for the entire MXF file. This checksum was produced during the extraction of the MXF file

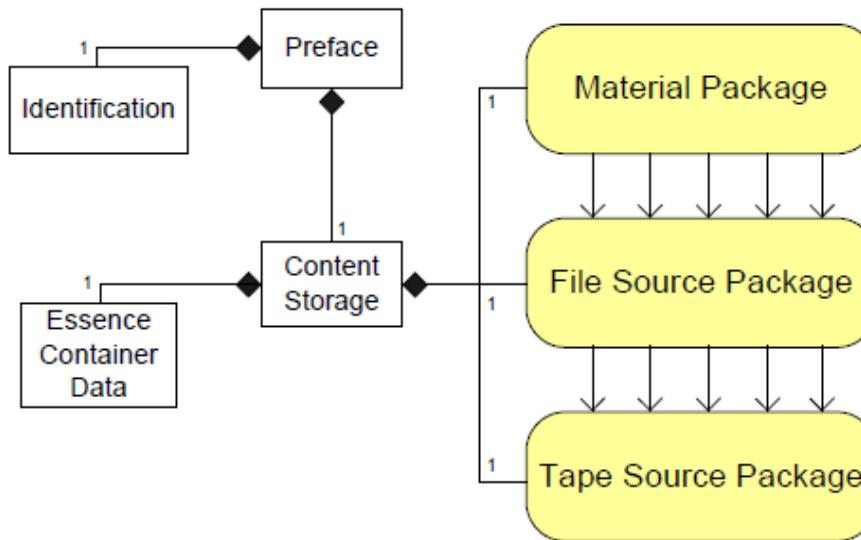


Figure 5 Preface and content storage packages

The Preface set contains two BBC extension items, D3P D3 Error Count and D3P PSE Failure Count, defined in Table 1. These count values are useful when reading a file from an LTO tape because the series of D3 VTR replay errors and PSE analysis failures are recorded in the footer section and are only available once the whole file has been transferred from the tape.

Name	Meaning	Type	UL
D3P D3 Error Count	Total number of D3 VTR replay errors	UInt32	06.0e.2b.34.01.01.01.01.0d.04.01.01.40.01.01.00
D3P PSE Failure Count	Total number of PSE analysis failures	UInt32	06.0e.2b.34.01.01.01.01.0d.04.01.01.40.01.02.00



Research & Development

White Paper

WHP 241

April 2013

A Guide to Understanding BBC Archive MXF Files

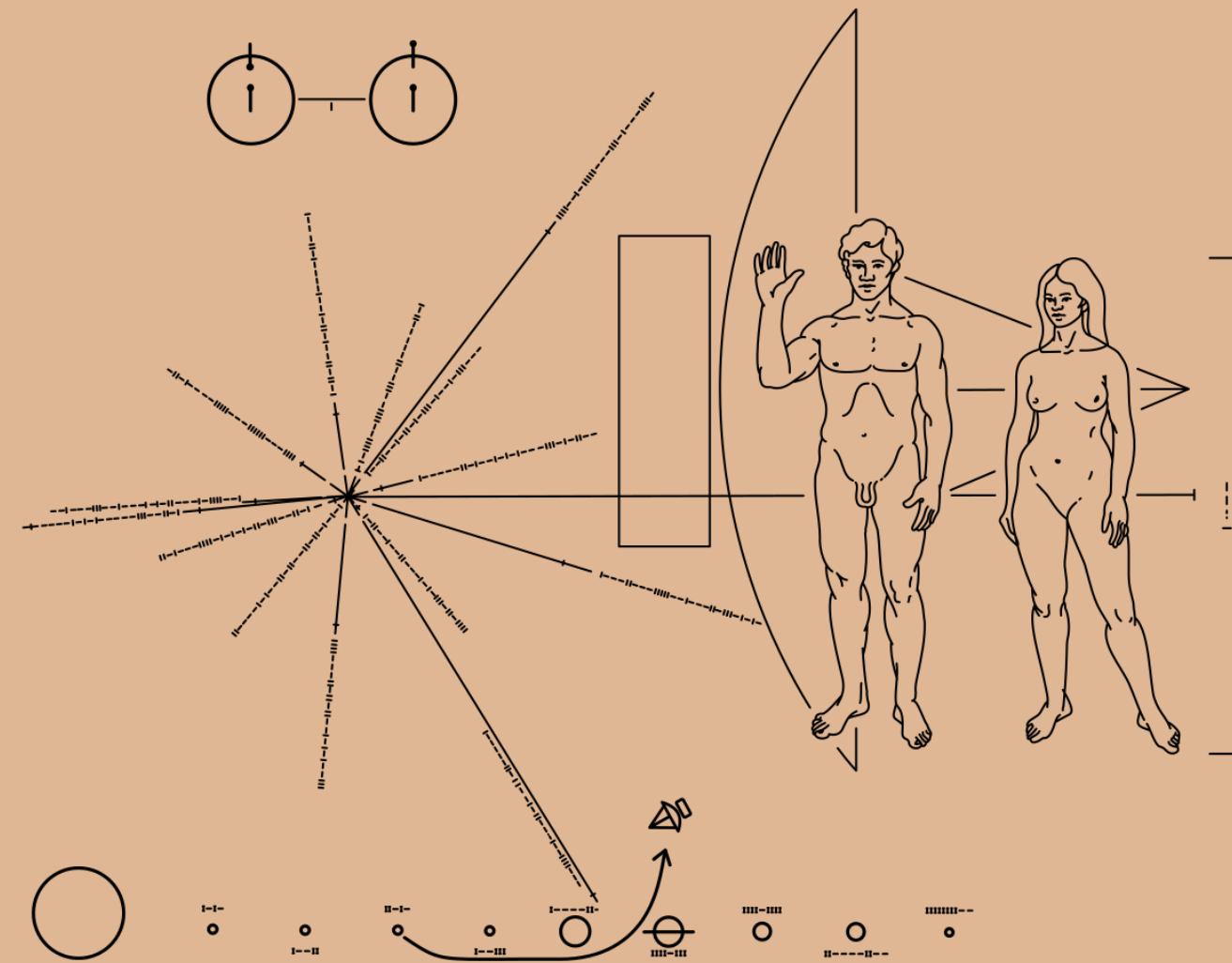
M. Glanville and T. Heritage

```
644     const MXFSoundirackInfo *sound_info, bool mca_detail)
645 {
646     const MXFMCALabelIndex *mca_label_index = reader->GetMCALabelIndex();
647     map<uint32_t, vector<AudioChannelLabelSubDescriptor*> > c_labels;
648     map<UUID, SoundfieldGroupLabelSubDescriptor*> sg_labels;
649     map<UUID, GroupOfSoundfieldGroupsLabelSubDescriptor*> gosg_labels;
650     size_t i;
651     for (i = 0; i < sound_info->mca_labels.size(); i++) {
652         AudioChannelLabelSubDescriptor *c_label = sound_info->mca_labels[i];
653         BMX_CHECK(c_label->haveMCAChannelID());
654         c_labels[c_label->getMCAChannelID()].push_back(c_label);
655
656         if (c_label->haveSoundfieldGroupLinkID()) {
657             UUID link_id = c_label->getSoundfieldGroupLinkID();
658             MCALabelSubDescriptor *label = mca_label_index->FindLabel(link_id);
659             SoundfieldGroupLabelSubDescriptor *sg_label = dynamic_cast<SoundfieldGroupLabelSubDescriptor*>
660             BMX_CHECK(sg_label);
661             sg_labels[link_id] = sg_label;
662
663             if (sg_label->haveGroupOfSoundfieldGroupsLinkID()) {
664                 vector<UUID> link_ids = sg_label->getGroupOfSoundfieldGroupsLinkID();
665                 size_t k;
666                 for (k = 0; k < link_ids.size(); k++) {
667                     UUID &link_id = link_ids[k];
668                     MCALabelSubDescriptor *label = mca_label_index->FindLabel(link_id);
669                     GroupOfSoundfieldGroupsLabelSubDescriptor *gosg_label = dynamic_cast<GroupOfSoundfield
670                     BMX_CHECK(gosg_label);
671                     gosg_labels[link_id] = gosg_label;
672                 }
673             }
674         }
675     }

```

asset.id	asset.title	asset.type	asset.materialtype	asset.siteidentity	bbc.programmenumber	bbc.episodetitle
101	31/01/1995 00:00	BBC Two	prov	LLCF545T/71	LLCF545T/71	JIM TAVARE PICTU
000	04/03/1992 00:00	BBC One	prov	LTFC143S/72	LTFC143S/72	PRIMETIME
05	16/10/1993 00:00	BBC One	prov	LMAA855A/71	LMAA855A/71	DANNY BAKER AFTE
01	29/10/1994 00:00	BBC Two	prov	LMBB717L/72	LMBB717L/72	THE LAST WORD
03	08/11/1993 00:00	BBC Two	prov	LMAV793T/01	LMAV793T/01	INSIDE VICTOR LE
02	30/12/1992 00:00	BBC Two	prov	LMAV740F/71	LMAV740F/71	TALKING REMBRAND
04	06/04/1994 00:00	BBC Two	prov	LMAA192X/71	LMAA192X/71	YOUNG MUSICIAN C
06	07/02/1984 00:00	BBC One	prov	LCHD311F/01	LCHD311F/01	GRANGE HILL:11
28	24/11/1978 00:00	BBC One	prov	LCHK040A/71	LCHK040A/71	JACKANORY:THE DR
30	25/01/1982 00:00	BBC One	prov	LCHJ144Y/71	LCHJ144Y/71	PLAYHOUSE:THE BU
82	07/01/1980 00:00	BBC One	prov	LCHJ043D/71	LCHJ043D/71	PLAYHOUSE:THE ST
86	30/08/1981 00:00	BBC One	prov	LCHC127E/71	LCHC127E/71	SWAP SHOP'S SUMM
61	18/01/1982 00:00	BBC One	prov	LCHJ142K/72	LCHJ142K/72	PLAYHOUSE:THE UN
51	12/04/1985 00:00	BBC One	prov	LCHE501X/72	LCHE501X/72	WHIZZ:IN THE SH
06	20/07/1983 00:00	BBC One Scotland	prov	LCHB093K/71	LCHB093K/71	BLUE PETER GOES
56	20/01/1982 00:00	BBC One	prov	LCHD235N/71	LCHD235N/71	THE STORY OF THE
2	06/04/1980 00:00	BBC One	prov	LCHC121P/71	LCHC121P/71	MULTI-COLOURED S
25	05/01/1983 00:00	BBC One	prov	LCHD045B/71	LCHD045B/71	CAPTAIN ZEP:SPAC
34	17/01/1979 00:00	BBC One	prov	LCHD003Y/71	LCHD003Y/71	THE STRANGE AFFA
54	30/05/1983 00:00	BBC One	prov	LCHC130L/71	LCHC130L/71	MIKE READ'S REPI
56	02/05/1983 00:00	BBC One	prov	LCHC129S/71	LCHC129S/71	MIKE READ'S REPI
36	08/04/1974 00:00	Unknown	prov	LCH2567S/01	LCH2567S/01	PLAY SCHOOL
29	05/06/1972 00:00	BBC One	prov	LCH2525P/01	LCH2525P/01	PLAY SCHOOL
2	25/05/1972 00:00	Unknown	prov	LCH9228Y/01	LCH9228Y/01	BLUE PETER
8	14/02/1974 00:00	Unknown	prov	LCH9339K/01	LCH9339K/01	BLUE PETER





BBC Archives

Securing the past for the future

steve.daly@bbc.co.uk

THE FUTURE

Brave new world = change is the only constant
Technology & Automation vs Skills & knowledge
Self serve
Role of archivist?

SO WHAT NEXT?

Digital preservation challenge

Retention of physical assets

Digitization is the first step

Opening up the archive is our goal

We want to share our collections with the people of Wales and beyond