Yokogawa Print Wave DX-P Reporter White Paper

May 2010 (revised 6/15/10 to change Print Wave version 5.2 to 5.5)

This document describes the operation and data flow of the Yokogawa Print Wave software using the DX-P Reporter. It will provide a detailed explanation of the Advanced Alarm Reporter functions. The functions described in this paper were first released in Print Wave version 5.5.

Overview

The Yokogawa Print Wave software is a specialized reporting application that performs report printing and file conversion tasks using the data contained within the binary data files of Yokogawa data acquisition products.

The purpose of this software is to automatically create printed reports and data files converted to common formats from the original Yokogawa binary files without any manual operator intervention. The Print Wave software includes individual Reporters that know how to interpret the unique, binary data files from different Yokogawa data acquisition devices. Each Reporter can then perform designated printing and file conversion tasks using those data files as the data source.

This paper will be concerned only with data files sourced from Yokogawa DX100P/DX200P models, collectively known as a "DX-P".

Since Print Wave is a PC application, the DX-P data files to be processed must first be moved from the DX-P to the PC environment. This is performed by the FTP client functions on the DX-P. FTP client mode allows the DX-P to automatically log onto a network FTP server and transfer a data file to the server at the time a new data file is saved to the local Compact Flash (CF) media on the DX-P. In this manner, an identical copy of each file is held in two locations; the DX-P CF media and on the FTP server. Either of these files can be declared the primary and the other can be considered a back up.
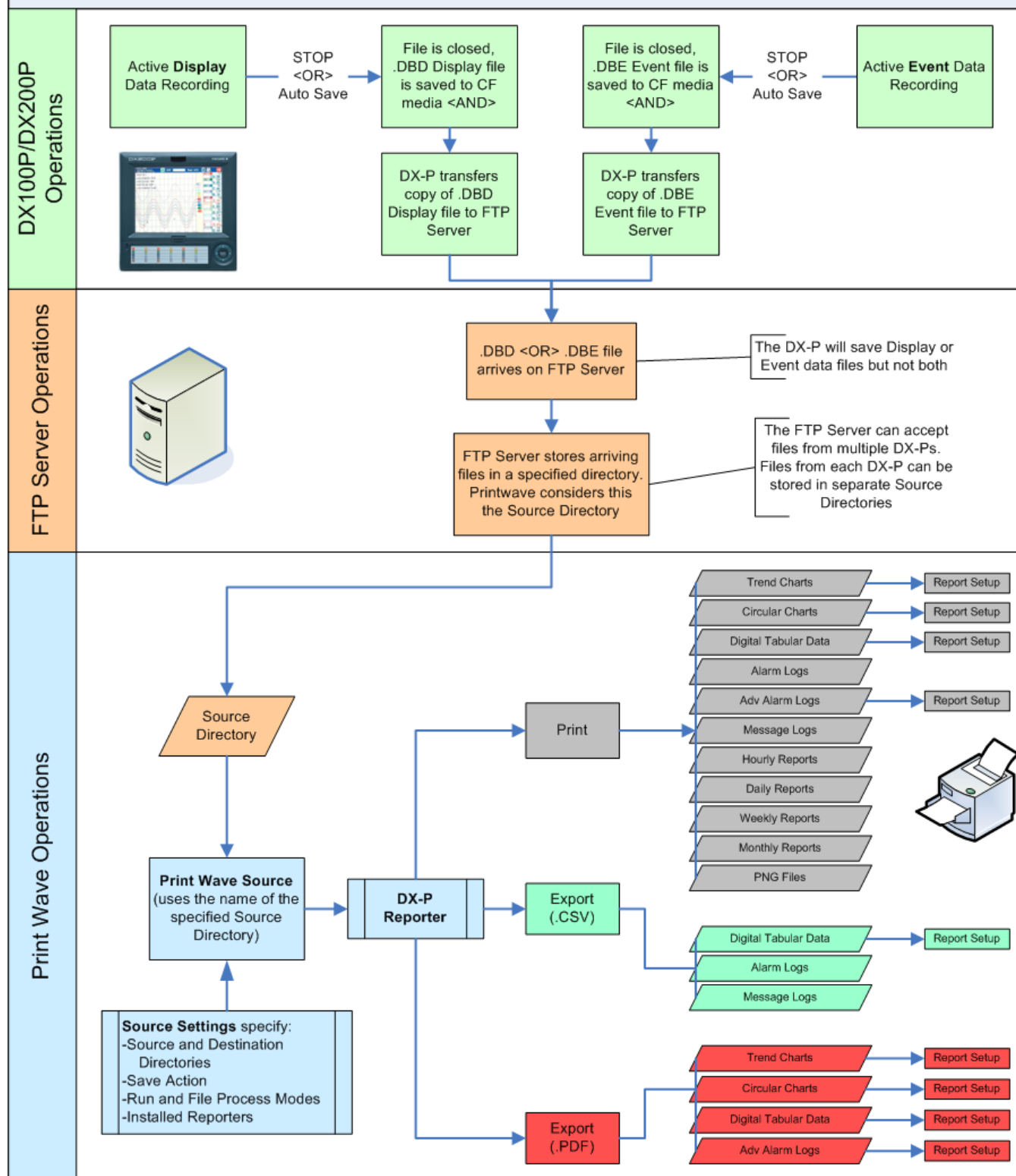
Print Wave can be installed on any network PC that has access to the data files sent to the FTP server. However, it is recommended to install Print Wave on the PC that is also assigned FTP server functions. This minimizes network log in complexity. This FTP server PC will accept data files sent directly from each DX-P (DX-P using FTP client mode); it will place these files in designated source directories.

When Print Wave is launched, it operates as a service within Windows. This means all Print Wave operations are performed with or without a user actively logged into the PC- it operates as long as the PC is powered up with Windows running.

Print Wave automatically recognizes the unique DX-P binary files as they arrive in a source directory and processes them according to the assigned Print Wave settings. The Print Wave DX-P Reporter has functions for Printing, Convert to .CSV, and Convert to .PDF file formats. Each function has settings to customize each operation.

The following pages explain the flow used by Print Wave to acquire and process the DX-P data files. An explanation of the DX-P alarm states and message events that are saved to the data files and the conditions for which they appear in the Advanced Alarm Report is included, along with a sample report.

DX100P/DX200P File Saving and Print Wave Process Flow

DX100P/DX200P Operations

Active **Display** Data Recording

→ STOP <OR> Auto Save →

File is closed, .DBD Display file is saved to CF media <AND>

↓

DX-P transfers copy of .DBD Display file to FTP Server

File is closed, .DBE Event file is saved to CF media <AND>

← STOP <OR> Auto Save ←

Active **Event** Data Recording

↓

DX-P transfers copy of .DBE Event file to FTP Server

FTP Server Operations

.DBD <OR> .DBE file arrives on FTP Server

The DX-P will save Display or Event data files but not both

↓

FTP Server stores arriving files in a specified directory. Printwave considers this the Source Directory

The FTP Server can accept files from multiple DX-Ps. Files from each DX-P can be stored in separate Source Directories

Print Wave Operations

Source Directory

Print Wave Source (uses the name of the specified Source Directory)

→ **DX-P Reporter** →

Source Settings specify:
-Source and Destination Directories
-Save Action
-Run and File Process Modes
-Installed Reporters

Print →

Trend Charts	Report Setup
Circular Charts	Report Setup
Digital Tabular Data	Report Setup
Alarm Logs	
Adv Alarm Logs	Report Setup
Message Logs	
Hourly Reports	
Daily Reports	
Weekly Reports	
Monthly Reports	
PNG Files	

Export (.CSV)

Digital Tabular Data	Report Setup
Alarm Logs	
Message Logs	

Export (.PDF)

Trend Charts	Report Setup
Circular Charts	Report Setup
Digital Tabular Data	Report Setup
Adv Alarm Logs	Report Setup

Supported DX-P File Types

Print Wave supports the DX-P data files shown in the table below. Display (.DBD) and Event (.DBE) data files are the data source for the Advanced Alarm Report.

File Extension	Description	Notes
.DBD	Display Data File	Min/Max data from Trend display
.DBE	Event Data File	Instantaneous data saved at fixed intervals
.DHR	Hourly Report File	Periodic report file available when /M1 math option is present
.DDR	Daily Report File	Periodic report file available when /M1 math option is present
.DWR	Weekly Report File	Periodic report file available when /M1 math option is present
.DMR	Monthly Report File	Periodic report file available when /M1 math option is present
.PNG	Screen Image File	Periodic report file available when /M1 math option is present

Print Wave Service Operation

Print Wave runs as a Service within Windows. This means that it can process data files for printing and conversion on the host PC as long as Windows is running, with or without a user logged-in. For example, if you are using this software on a workstation PC and you normally log into Windows on start-up (with a user name and password), you will have access to all Print Wave functions, and the software will run in the background to automatically process the DX-P data files. As a service, the software will continue to operate (automatically processing files), if the user logs out of Windows and leaves the PC powered up.

Print Wave will automatically start as soon as Windows is fully booted following power up, but before a user logs in. In this manner, the software can operate continuously on the host PC, protected by the normal Windows log on measures.

Printer Access

In order for Print Wave to be able to access a printer, a Service Log In may be required. This will be the case if this software is going to print to a printer that resides on a network (not attached directly to the host PC). Alternately, a local printer can be specified, and in this case, no service log in is needed. A local printer is one that is directly attached to the PC via the parallel printer port, serial ports, USB port or other direct, non-networked connection.

A Service Log In is a Windows setting that gives a Windows Service (Print Wave in this case) access rights to reach another computer or peripheral (printer in this case). Print Wave will require a service login under the following conditions:

- When the host computer accesses the target printer via a network connection.
- When the Source and/or Destination file directories reside on another computer that is accessed via a network connection.

A service login is NOT required when:

- The printer is local to the host PC (no network connection).
- Only Print Wave file conversion functions are to be used (no printing). In this case, do not check any Print Report items in the report menu.

Advanced Alarm Reporter Operation

The Print Wave 5.5 Advanced Alarm Reporter produces a specialized alarm report using DX-P data files. This section explains the conditions and alarm states that produce a date and time stamped entry in the DX-P .DBD and .DBE data file Alarm List and the subsequent reports generated by the Print Wave Advanced Alarm Report.

The Advanced Alarm Report can generate a printed report, or PDF file of the report, or both at the same time. The content, appearance, and format of the report are identical in both cases, as are the conditions that generate the report.

At the time the report is to be generated, Print Wave 5.5 looks at the alarm status data contained in the DX-P data file alarm list for the information it needs. For Comment data, it reads the message(s) applied by the logged-in user saved in the message list in the same data file. Since Comments are applied as a one-time event, the comment text will appear only in the report for the data file that it was first applied in. Comments will not appear in reports that carry alarm information across multiple data files.
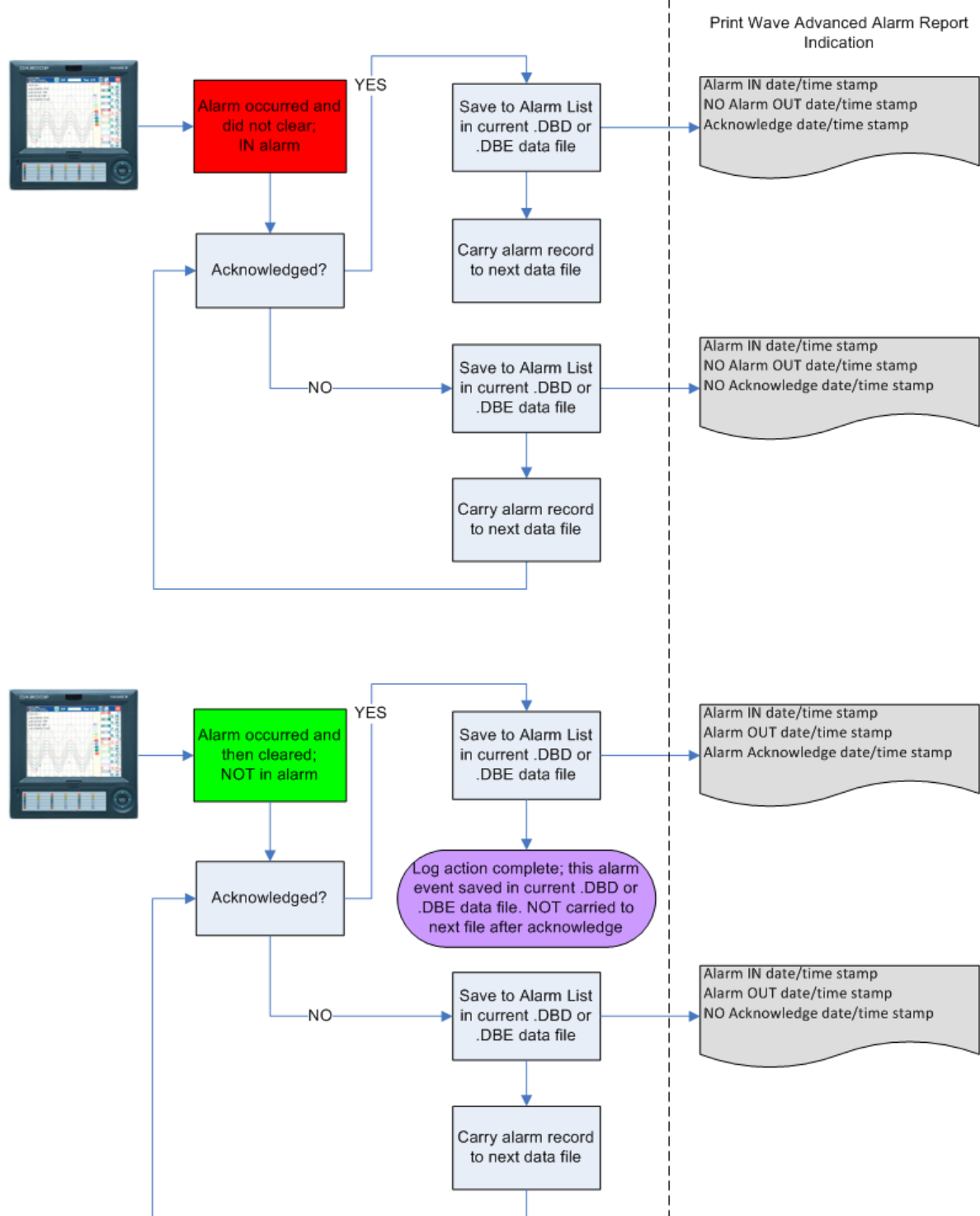
DX-P Alarm States

There are four alarm states that can produce a DX-P data file Alarm List entry and subsequent Advanced Alarm Report:

1. IN alarm and acknowledged- alarm occurred, did not clear, and was acknowledged. Visible in Advanced Alarm Report:
    a. Alarm IN date/time stamp
    b. No Alarm OUT date/time stamp
    c. Alarm Acknowledge date/time stamp
    This record appears in the next data file if these conditions do not change

2. IN alarm but not acknowledged- alarm occurred, did not clear, and was NOT acknowledged. Visible in Advanced Alarm Report:
    a. Alarm IN date/time stamp
    b. No Alarm OUT date/time stamp
    c. No Acknowledge date/time stamp
    This record appears in the next data file if these conditions do not change

3. OUT of alarm and acknowledged- alarm occurred, then cleared, and was acknowledged. This record will NOT be carried to the next data file. Visible in Advanced Alarm Report:
    a. Alarm IN date/time stamp
    b. Alarm OUT date/time stamp
    c. Alarm Acknowledge date/time stamp
    This record is complete and appears only in the current data file

4. OUT of alarm and NOT acknowledged- alarm occurred, then cleared, but NOT acknowledged. Visible in Advanced Alarm Report:
    a. Alarm IN date/time stamp
    b. Alarm OUT date/time stamp
    c. No Acknowledge date/time stamp
    This record appears in the next data file if these conditions do not change

DX100P/DX200P Print Wave Advanced Alarm Report Process Flow

DX100P/DX200P Operations

Print Wave Advanced Alarm Report Indication

Alarm occurred and did not clear; IN alarm

→ YES → **Save to Alarm List in current .DBD or .DBE data file**
- Alarm IN date/time stamp
- NO Alarm OUT date/time stamp
- Acknowledge date/time stamp

↓ **Carry alarm record to next data file**

Acknowledged?

→ NO → **Save to Alarm List in current .DBD or .DBE data file**
- Alarm IN date/time stamp
- NO Alarm OUT date/time stamp
- NO Acknowledge date/time stamp

↓ **Carry alarm record to next data file**

Alarm occurred and then cleared; NOT in alarm

→ YES → **Save to Alarm List in current .DBD or .DBE data file**
- Alarm IN date/time stamp
- Alarm OUT date/time stamp
- Alarm Acknowledge date/time stamp

↓ **Log action complete; this alarm event saved in current .DBD or .DBE data file. NOT carried to next file after acknowledge**

Acknowledged?

→ NO → **Save to Alarm List in current .DBD or .DBE data file**
- Alarm IN date/time stamp
- Alarm OUT date/time stamp
- NO Acknowledge date/time stamp

↓ **Carry alarm record to next data file**

Source and Destination Directory Operations

Print Wave has several methods of managing the flow of the DX-P data files used for the reports it generates.

The Save Action setting for the Source Directory has three choices:

1. Do Not Save
    a. Action- the arriving file is processed and then deleted from the Source Directory. It is not saved.
2. Move to Destination Directory.
    a. Action- the arriving file is processed and then moved to the Destination Directory and does not remain in the Source Directory.
3. Copy to Destination Directory
    a. Action- the arriving file is processed and is copied to the Destination Directory; a copy is now in both the Source and Destination Directories.

Multiple Destination Directories can be assigned including those on network servers, thus allowing the source data files to be safely archived in multiple locations. The user can choose the best file handling methods for their application.

Deleting Old Files in the Source Directory

Print Wave can be instructed to delete existing files in the Source Directory after a fixed number of days. Setting choices are Do Not Delete or 2-30 days. If this setting is enabled and Combine File mode is enabled, Advanced Alarm Report information may be missing or incorrect for the planned period because the files used as the data source were deleted before the report was scheduled to run. Use this setting with caution.

Conditions for Generating an Advanced Alarm Report

Print Wave can generate the alarm report (printed and/or PDF file) under a number of conditions as determined by settings in the Run Mode menu. These conditions are:

1. Automatically at the time a new data file arrives in the Source Directory.
    a. This is the Auto Scan setting. Each time a new file arrives a report is immediately processed.
2. At a specific time of day.
    a. This is the Set Times setting; choose the time of day.
3. At a daily interval.
    a. Choose the reference hour and then the hour of the day.
4. At a weekly interval.
    a. Choose the day of the week and the hour of the day.
5. At a monthly interval.
    a. Choose the day of the month and the hour of that day.

File Process Mode; Individual or Combined File Processing

The File Process Mode setting instructs Print Wave to process files individually, or to combine them. For all of the above conditions except for Auto Scan, Print Wave will acquire the alarm record data from all of the files in the Source Folder over the chosen time period and produce a single Advanced Alarm Report.

Reports can also be manually processed on demand by invoking the Process Now function from the main menu File pull down menu. Print Wave will promptly process a report of the files in the Source Directory.

Report Format

The report contains a header with the following data fields:

Field Name	Description
File Header	Descriptive text entered in the DX-P File Header setting field; 32 characters
Device Type	DX-P model series; DX100P or DX200P; fixed information from the data file
Serial No.	DX-P serial number; fixed information from the data file
Start Time	The start date and time of the data file containing the alarm log
End Time	The end date and time of the data file containing the alarm log
Number of Alarms	The total number of alarm events that appear on this report

The main body of the report contains the following information, arranged in vertical columns from left to right across the page:

Column	Description	Notes
Channel/Tag	Alarm channel identification	If a tag name is used in the DX-P data file, the tag name will appear by default. If no tag name is used, the channel number will appear
Type	Alarm type (i.e. Low, High)	The DX-P provides 6 alarm types for measure channels and 4 alarm types for each math channel
Min/Max Value	The MIN or MAX value while in alarm is displayed	The MIN value is displayed for Low alarm type. The MAX value is displayed for High alarm type
Alarm In	Date and time the alarm occurred	The local date and time for the DX-P that produced the data file is shown in these fields
Alarm Out	Date and time the alarm cleared (out of alarm)	
Acknowledged	Date and time the alarm was acknowledged	
Comment	Information about the alarm entered by the user that acknowledged the alarm	32 character free text message entered on DX-P
User Name	User name of the person who acknowledged the alarm and entered the comment	The user name of the person that acknowledged an alarm or entered a comment will be displayed.

Sample Advanced Alarm Report from PDF File

Advanced Alarm Report

File Header:
Device Type: DX200P   Start Time: 06/01/2010 16:57:44.000
Serial No: 12A930662   End Time: 06/01/2010 17:02:34.000

Number of Alarms: 3

Channel/Tag	Type	Min/Max	Into Alarm	Out of Alarm	Acknowledged	Comment	User Name
CH001	Low	8.7 / 11.3	06/01/2010 16:57:56.000	06/01/2010 16:58:36.000	06/01/2010 16:58:09.000		STEVE
					06/01/2010 16:58:26.125	NO PRODUCT RISK	STEVE
					06/01/2010 16:59:33.125	PROCESS NORMAL	STEVE
CH031	High	52.20 / 83.20	06/01/2010 17:00:50.000	06/01/2010 17:02:30.000	06/01/2010 17:01:06.000		STEVE
					06/01/2010 17:01:19.500	ABNORMAL	STEVE
CH031	High	78.00 / 83.20	06/01/2010 17:01:34.000	06/01/2010 17:02:20.000	06/01/2010 17:01:54.000		STEVE
					06/01/2010 17:02:07.125	CALLED MAINTENANCE	STEVE