Laboratoire Central des Industries Electriques

Une société de Bureau Veritas

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EQUIPMENT FOR USE IN EXPLOSIVE ATMOSPHERES
EVALUATION REPORT N°136450-674122-2

☒ ATEX	CE Ex
☒ Equipment	☐ Component

☐	For EC type examination certificate application (Annex III)
☐	For supplementary EC type examination certificate application (Annex III)
☐	For unit verification conformity certificate application (Annex IX)
☐	For volontary type examination certificate application
☒	For supplementary volontary type examination certificate application

☐ IECEx	IEC IECEx
☐ Equipment	☐ Component

☐	For certificate of conformity application
☐	For supplementary certificate of conformity application

ExTR reference N°..... FR/LCIE/ExTR

Standard(s) EN (year)	
EN 60079-0:2012 + A11:2013	
EN 60079-15:2010	

Standard(s) IEC (Edition)	

	Certification Body (ExCB)	Testing Laboratory (ExTL)
Name ..... :	LCIE	LCIE
Address ..... :	33, Avenue du General Leclerc 92260 Fontenay-aux-Roses / FRANCE	33, Avenue du General Leclerc 92260 Fontenay-aux-Roses / FRANCE

	Applicant	Manufacturer
Name ..... :	Banner Engineering Corporation	Banner Engineering Corporation
Address ..... :	9714 10th Avenue North Plymouth, MN 55447 USA	9714 10th Avenue North Plymouth, MN 55447 USA

	ExTL		ExCB
	Compiled by	Reviewed by	Approved by (Conformity Assessment officer)
Name	M.EQUI	M.EQUI	Pablo SANTOS ALVAREZ
Date	02/12/2015	02/12/2015	15/12/2015
Signature			

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B_4482692

ПРОМЭЛЕКТРОНИКА/ sales@prom-elec.com

General product information

Le matériel est destiné à transmettre par radio des informations provenant de différents capteurs.

Le transmetteur peut être réalisé dans les versions suivantes :
- DX70...C, DX80..., DX80...C, DX80...E et DX85...C : versions boîtier plastique avec alimentation FlexPower batterie DX81.
- DX80...B : version boîtier métallique.

Les modèles DX70... et DX80... sont équipés d'un module radio et sont utilisés pour la communication sans fil.
Les modèles DX85... ne sont pas équipés de module radio et sont utilisés comme un équipement I/O à travers une liaison série.

Revision history

Initial issue :	14/08/2008 : certification selon les normes EN 60079-0:2006 et EN 60079-15:2005.
Avenant 01 :	12/08/2009 : adjonction du modèle DX80 1 Watt, modifications mineures de circuit, modifications mineures de composants, mise à jour de documents.
Avenant 02 :	23/11/2009 : mise à jour normative suivant la norme EN 60079-0:2009, adjonction d'un nouveau type de connecteur.
Avenant 03 :	02/12/2015 : mise à jour normative suivant les normes EN 60079-0:2012 + A11:2013 et EN 60079-15:2010, adjonction du modèle DX80...E, adjonction de variantes aux modèles existants, mise à jour des documents.

Test item description .....:	Contrôleur de réseau sans fil
Trademark .....:	Banner Engineering Corporation
Type.....:	DX70...C, DX80..., DX80...C, DX85...C, DX81, DX80...E

Tests not performed by the ExTL (sub-contracting and/or Test Results Acceptance)

- rapport d'évaluation ExProtec n°2014-08 du 04/07/2015 (11 pages).
- rapport de test CSA 1921239 projet 70012202 Edition 6 du 18/03/2015.

Marking .....:

ATEX	IECEx
Modifié comme suit : BANNER ENGINEERING CORPORATION Adresse : ... Type : DX70...C, DX80..., DX80...C, DX85...C, DX81, DX80...E (1) N° de fabrication : ... Année de fabrication : ... Ⓔx II 3 G Ex nA IIC T4 Gc LCIE 10 ATEX 1012 X -40°C ≤Tamb ≤+80°C AVERTISSEMENT-DANGER POTENTIEL DE CHARGES ELECTROSTATIQUES-VOIR INSTRUCTIONS (1) complété du modèle	

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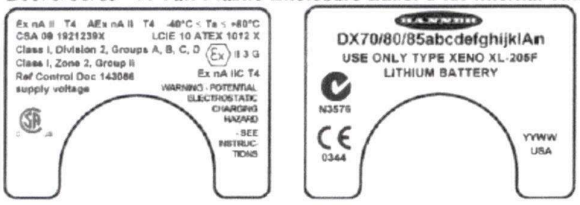
Copy of marking plate : Exemple de marquage :

DX70/80/85 –A Tall Plastic Enclosure Label's for internal battery devices.



Supply voltage will display "+3.6V to 5Vdc", "+10V to 30Vdc", or "+3.6Vdc/+10V to 30Vdc" depending on the model. 900MHz models will not display the C-Tick symbol. Only internal battery versions will display battery information.

DX70/80/85 –C (short) Plastic Enclosure Label, Flex Gateway, and Data Radio.



Supply voltage will display "+10V to 30Vdc" or "3.6Vdc/+10V to 30Vdc" depending on the model. 900MHz models will not display the C-Tick symbol.

DX80 –E (Environmental) Plastic Enclosure Label.



Supply voltage will display "3.6Vdc", "+10V to 30Vdc" or "3.6Vdc/+10V to 30Vdc" depending on the model. 900MHz models will not display the C-Tick symbol.

DX80 –E (Environmental) Plastic Enclosure Label.



DX81 Plastic Enclosure Label.



XXXX will display "LITH" or nothing depending on the model.

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L C I E	**Report n° ..... :** 136450-674122-2
	Applicant .....: Banner Engineering Corporation Product range.....: Contrôleur de réseau sans fil Type .....: DX70...C, DX80..., DX80...C, DX85...C, DX81, DX80...E

Rating(s) .....: :
Modifiés comme suit :

Tension d'alimentation :
DX81, DX80 (batterie interne) : 3,6V DC
DX80DR, DX80-C flex power : 3,6V DC à 5V DC ou 10V DC à 30V DC
DX70, DX85, DX80 10-30 : 10V DC à 30V DC
DX80-E flex power (batterie interne) : 3,6V DC à 5V DC ou 10V DC à 30V DC

Conditions of Certification for equipment or Schedule of limitations for component (IECEx) Special condition for safe use (ATEX)	Inchangées : L'appareil doit être placé dans une enveloppe conforme à la catégorie 3G. Les distances entre l'équipement et les côtés de l'enveloppe doivent être suffisant pour ne pas provoquer une augmentation de la classe de température. Température ambiante d'utilisation : -40°C à + 80°C
Routine test	Néant.

Classification of installation and use .....:	fixe
Ingress protection .....:	> IP20
Rated ambient temperature range (°C) .....:	-40°C à +80°C
Rated service temperature range (°C) for Ex components .....:	N/A (ce n'est pas un composant)

Manufacturer's documents

Title	Reference	Revision	Date
Dossier technique	B_083186	5	15/05/2015
Notice d'instruction (incluse dans le dossier technique)	143086	B	03/2015

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But de l'avenant :

- mise à jour normative suivant les normes EN 60079-0:2012 + A11:2013 et EN 60079-15:2010,
- adjonction du modèle DX80...E,
- adjonction de variantes aux modèles existants,
- mise à jour des documents.

Analyse :

1/ mise à jour normative selon la norme EN 60079-0:2012 + A11:2013 :

EN 60079-0:2012 / IEC 60079-0:2011 ed. 6.0 (compared to EN 60079-0:2009 / IEC 60079-0:2007 ed. 5.0)						
EN 60079-0:2012 / IEC 60079-0 ed. 6.0		Type			Result / Remark	Verdict
Significant Changes	Clause	Minor and editorial	Extension	Major technical		
Expansion of material specification data for plastics and elastomers, including UV resistance	7.1.2		x		Exclu par la norme EN 60079-11:2012	N/A
Addition of alternative qualification for O-rings	7.2.3		x		Il n'y a pas de O-ring	N/A
Addition of alternative criteria for surface resistance	7.4.2 a)		x		Si nécessaire en fonction de la version, l'appareil a un marquage d'avertissement : AVERTISSEMENT : DANGER POTENTIEL DE CHARGES ELECTROSTATIQUES-VOIR INSTRUCTIONS	pass
Addition of alternative breakdown voltage limit for non-metallic layers applied to metallic enclosures	7.4.2 c)		x		L'appareil n'est pas concerné	N/A
Expansion of "X" marking options for non-metallic enclosure materials not meeting basic electrostatic requirements	7.4.2 d) 7.4.2 e)		x		Si nécessaire en fonction de la version, l'appareil a un marquage d'avertissement : AVERTISSEMENT : DANGER POTENTIEL DE CHARGES ELECTROSTATIQUES-VOIR INSTRUCTIONS	pass
Clarification that non-metallic enclosure requirements also apply to painted or coated metal enclosures	7.4.3		x		L'appareil n'est pas concerné	N/A
Clarification of test to determine capacitance of accessible metal parts with reduction in acceptable capacitance	7.5 Table 9			C1	L'appareil n'est pas concerné	N/A
Addition of limits on zirconium content for Group III and Group II (Gb only) enclosures	8.3 8.4		x		Il n'y a pas de zirconium	N/A
Introduction of "X" marking for Group III enclosures not complying with basic material requirements, similar to that existing for Group II	8.4	x			Ce n'est pas un appareil du groupe III	N/A
Addition of button-head cap screws to permitted "Special	9.2		x		Il n'y a pas de fermeture spéciale	N/A

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EN 60079-0:2012 / IEC 60079-0:2011 ed. 6.0
(compared to EN 60079-0:2009 / IEC 60079-0:2007 ed. 5.0)

EN 60079-0:2012 / IEC 60079-0 ed. 6.0		Type			Result / Remark	Verdict
Significant Changes	Clause	Minor and editorial	Extension	Major technical		
Fasteners"						
Reference for protective earthing (PE) requirements for rotating electrical machines to EN 60034 1	15.3	x			Ce n'est pas une machine rotative	N/A
Addition of requirements for ventilating fans	17.1.5			C2	Ce n'est pas un ventilateur	N/A
Addition of alternative construction for disconnectors	18.2		x		Ce n'est pas un connecteur	N/A
Removal of voltage limits on plugs and sockets	20.2		x		Ce n'est pas une prise	N/A
Addition of test requirements for arc-quenching test on plugs and sockets	20.2			C3	Ce n'est pas une prise	N/A
Additional information on cell voltages	23.3 Table 12			C4	Type E	pass
Revision to impact test of glass parts	26.4.2	x			Conforme à cela	pass
Revision to impact test procedure to address "bounce" of impact head	26.4.2		x		Conforme à cela	pass
Clarification of the test requirements for "service" and "surface" temperature	26.5.1.2 26.5.1.3	x			Il n'y a pas de température de service	N/A
Addition of temperature rise tests for converter-fed motors	26.5.1.3		x		Ce n'est pas un "converter-fed motor"	N/A
Addition of alternative test method for thermal endurance	26.8 Table 15		x		Pas nécessaire pour ce type de matériel	N/A
Removal of "charging test" and addition of note providing guidance	Formerly 26.14			C5	Si nécessaire en fonction de la version, l'appareil a un marquage d'avertissement : AVERTISSEMENT : DANGER POTENTIEL DE CHARGES ELECTROSTATIQUES- VOIR INSTRUCTIONS	pass
Clarification of test for the measurement of capacitance	26.14	x			Si nécessaire en fonction de la version, l'appareil a un marquage d'avertissement : AVERTISSEMENT : DANGER POTENTIEL DE CHARGES ELECTROSTATIQUES- VOIR INSTRUCTIONS	pass
Addition of a "Schedule of Limitations" to certificates for Ex Components	28.2	x			Ce n'est pas un composant Ex	N/A
Clarification of the marking for multiple temperature classes	29.3 d)	x			Un seul classement en température	N/A
Addition of marking for converter-fed motors	29.14	x			Ce n'est pas un "converter-fed motors"	N/A
Removal of IP marking for Group III	29.4 29.15	x			Ce n'est pas un matériel groupe III	N/A
Addition of specific instructions for electrical machines and for ventilating fans	30.3 30.4	x			Ce n'est pas une machine électrique ni un ventilateur.	N/A

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C1 – The values in the table have been significantly reduced based on information that is intended to be published in IEC 60079-32 (currently in preparation).

C2 – The requirements for fans which are not integral to the cooling system of a rotating electrical machine were added to the IEC version of the standard at the request of the IECEx International Product Certification Scheme as such requirements do not exist elsewhere in international standards. These requirements were removed from the EN version of the standard by common modification and replaced by reference to other European standards harmonised under the ATEX Directive 94/9/EC. If this clause is being used for IECEx purposes, it should be noted that the major new requirement for fans relates to the back pressure considerations which are also specifically addressed in EN 14986:2007.

C3 – The test has been introduced for all disconnectors as an alternative to the voltage and current restrictions in the previous standard which were considered to be arbitrary.

C4 – There has been a slight increase in some cell voltages. This is a minor change for most protection concepts but should be regarded as a major change for equipment having a type of protection relying on energy limitation, e.g. EN 60079-11
C5 – The charging test was removed as it had been found to be not repeatable. Guidance is currently provided in CLC/TR 50404 and will be given in IEC 60079-32 which is in preparation.

EN 60079-0:2012 + A11:2013 (compared to EN 60079-0:2012)						
EN 60079-0:2012 / IEC 60079-0 ed. 6.0		Type			Result / Remark	Verdict
Significant Changes	Clause	Minor and editorial	Extension	Major technical		
Hexagon socket set screws	9.3.3	x			Le couvercle du boîtier est fixé sur le corps par 4 vis à tête crusiforme.	N/A
General	29.3	x			Le nom et l'adresse du constructeur figurent sur la plaque signalétique	Pass
Ex Component	29.9	x			Ce n'est pas un composant Ex	N/A
Small equipment and small Ex Component	29.10	x			Ce n'est pas un petit équipement ou composant	N/A

2/ mise à jour normative selon la norme EN 60079-15:2010 :

EN 60079-15:2010 / IEC 60079-15:2010 ed. 4.0 (compared to EN 60079-15:2005 / IEC 60079-15:2005 ed. 3.0)					
EN 60079-15:2010 IEC 60079-15 ed. 4.0	Type			Result / Remark	Verdict
Significant Changes	Minor and editorial	Extension	Major technical		
Addition of Equipment Protection Levels		X		Niveau de protection Gc	pass
Removal of the requirements for Energy-limited "nL" and associated energy limited apparatus "[nL]"		X		Ce n'est pas un appareil nLou [nL]	N/A
Removal of the requirements for Encapsulated Devices "nC"		X		Ce n'est pas un appareil nC	N/A
Requirements for electrical connections expanded and clarified		X		Type de materiel non concerné	N/A
Requirements for luminaire ballasts expanded and clarified		X		Ce n'est pas un luminaire	N/A
Requirements for evaluation and testing of motors rotors clarified	X			Ce n'est pas un moteur	N/A

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EN 60079-15:2010 / IEC 60079-15:2010 ed. 4.0 (compared to EN 60079-15:2005 / IEC 60079-15:2005 ed. 3.0)					
EN 60079-15:2010 IEC 60079-15 ed. 4.0	Type			Result / Remark	Verdict
Significant Changes	Minor and editorial	Extension	Major technical		
15 kV limit for Equipment protection by type of protection "n" added		X		Equipement très faible tension (< 30V)	N/A
Spacing requirement for voltages above 10 kV modified		X		Equipement très faible tension (< 30V)	N/A
Requirements for restricted breathing enclosures modified		X		Ce n'est pas une enveloppe à respiration limitée	N/A
Modification to requirements for motor rotors and stators		X		Ce n'est pas un moteur	N/A
Addition of Annex A (informative): Information on installation of nA machines	X			Ce n'est pas une machine nA mais un transmetteur nA	N/A

3/ adjonction du modèle DX80...E, adjonction de variantes aux modèles existants, mise à jour des documents :

Ces modifications font l'objet des documents suivants :
- rapport d'évaluation ExProtec n°2014-08 du 04/07/2015 (11 pages).
- rapport de test CSA 1921239 projet 70012202 Edition 6 du 18/03/2015.

Compte tenu que les normes mentionnées dans ces documents ne sont plus applicables ou ne sont pas à la dernière édition, la différence a été analysée ci-dessus.
L'analyse et les essais effectués ont été jugés satisfaisant.
Aucune reprise n'a été nécessaire.
Ces documents sont donnés en annexe.

Conclusion :

L'appareil est conforme aux exigences des normes EN 60079-0:2012 + A11:2013 et EN 60079-15:2010.
Seul le marquage est modifié.

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33, avenue du Général Leclerc
92260 Fontenay-aux-Roses
FRANCE

ELECTRICAL EQUIPMENT FOR EXPLOSIVE ATMOSPHERES

(TYPE OF PROTECTION "n")

SUPPLEMENTARY VERIFICATION AND TEST REPORT

Report No. 136450 (11 pages) regarding Variation LCIE 10 ATEX 1012 X/03

ExProtec Ref. No. 2014-08

Reference Standards

- EN 60079-0:2006
- EN 60079-15:2005
- EN 60079-31:2008

Submittor: Banner Engineering Corporation
9714 10th Avenue North
Plymouth, MN 55447
U.S.A.

Designation (Function): Wireless Network Controllers

Model/Catalogue No.: DX70...C, DX80..., DX80...C, DX85...C, DX81, DX80...E

Manufacturer: Banner Engineering Corporation
9714 10th Avenue North
Plymouth, MN 55447
U.S.A.

Version	ATEX Code	Protection Code
DX70…C, DX80…, DX80…C, DX85…C, DX81, DX80...E (plastic enclosure versions)	II 3 G	Ex nA IIC T4

SCOPE

This project covers the following:

1. Addition of Model DX80...E

   These models are similar to previously certified models except that they use the new larger plastic "environmental" enclosure. Variants using this enclosure, as for ones using the other plastic enclosures, shall be installed in an enclosure according the Category 3G as outlined in the Special Conditions for Safe Use in the certificate.

2. Addition of Variants of Existing Models

   These models are similar to previously certified models with different functionality.

3. Document revisions as outlined in the table below:

   The new/revised documents as shown in the table below:

Component	Function	Item	Subject	Existing Drawing			New Drawing			Document Change Description/Explanation
				Document No.	Rev.	Shts	Document No.	Rev.	Shts	
Common Drawings	Common Drawings	C1	LCIE Technical File	B_083186	4	5	B_083186	5	7	- updated to list revised/new documents
		C2	LCIE Descriptive Notice	B_083190	2	9	B_083190	2	10	- updated to cover new models and variants
		C3	Label Drawing	134430_D2Z2	B	6	134430	C	9	- added labels for new models
		C4	DX8x Control Drawing	143086A	A	28+	143086	B	58	-added new models
		C5	Document Map	134429	C	6+	134429	D	13	- added new models
		C7	Exploded Mechanical View	134431	A	8	134431	E	19	- added new models
		C8	Enclosure Dimensions	134432	A	8	134432	C	15	- added new models
						0				
Mixed I/O	Main Board	D15	Raw PCB	126989	B	11	126989	E	11	- document change only → changed Note 1 on page 11 from "THIS IS A SIX LAYER THRU-HOLE AND SMD AND COB TECHNOLOGY DESIGN." to "THIS IS A SIX LAYER THRU-HOLE AND SMD TECHNOLOGY DESIGN."
		D16	Schematic	128652	J	6	128652	L	6	- correction to revision history (Rev. I was listed twice, so the second Rev. I becomes Rev. J, Rev. J becomes Rev. K) - variant table update done under Rev. L - the previous evaluation remains representative
		D17	Assembly	126989ASSY	B	2	126989ASSY	D	2	- document Rev. changed resulting from schematic Rev. change
		D18	BOM	126989BOM	C	12	126989BOM	E	12	- document Rev. changed resulting from schematic Rev. change
	Wiring Board Weatherford	D122	Raw PCB	-	-	-	176216	A	7	- the Weatherford wiring board is an alternative wiring board for use with the 4422 Line Powered (Mixed IO) devices - this board is designed specifically for Weatherford (a particular customer of Banner Engineering) - it has an added resistor divider to lower the voltage analog output from the standard 0-10V range to the millivolts range for a Weatherford terminal - the previous evaluation remains representative
		D123	Schematic	-	-	-	176217	A	1	
		D124	Assembly	-	-	-	176218	1	1	
		D125	BOM	-	-	-	176218BOM	1	1	
		*	Dimension Drawing	-	-	-	134266	*	0	
						0				
Analog I/O	Main Board	D31	Raw PCB	131558	B	11	131558	C	11	- document change only → changed Note 6 on page 11 from "FINISH PER BANNER ENGINEERING FLASH GOLD." to "FINISH PER BANNER ENGINEERING FINISH SPECIFICATION 120597 LATEST REV."
		D32	Schematic	137669	E	6	137669	F	6	- document change only → added circle to call out regulators changed for Rev E
		D34	BOM	131558BOM	C	12	131558BOM	E	12	- document change only → in header of documents, assembly number changed from "All ASSY" to "ALL PARTS" and Raw PCB revision changed from "B" to "C"
	Wiring Board C	D41	Schematic	139381	A	1	139381	B	1	- added no LED variant (option of not placing LED9) - the previous evaluation remains representative
						0				
Digital I/O	Main Board	D44	Raw PCB	130122	C	11	130122	D	11	- document change only → changed note 6 on page 11 from "FINISH PER BANNER ENGINEERING FLASH GOLD." to "FINISH PER BANNER ENGINEERING FINISH SPECIFICATION 120597 LATEST REV."
		D45	Schematic	131689	G	10	131689	H	10	- document changes only → updated variant table to include C18, IC14, R41, & R42 in the table and updated Variant table to include changes in R173, R176, R188, R189 & R195 - the previous evaluation remains representative
		D47	BOM	130122BOM	D	14	130122BOM	E	11	- document change only → increased raw PCB revision level
						0				
Flex Gateway and Data Radio	Main Board	D76	Schematic	135497	G	4	135497	H	4	- remove R70, R71, R72, R73, R74, R147, R165, R166, C31, C33, C36, C38, C39, C40, L2, D12, and U6 to remove Vbuck circuit (not being used/cost reduction) - add R167 to provide Vdd power to radio

Component	Function	Item	Subject	Existing Drawing Document No.	Rev.	Shts	New Drawing Document No.	Rev.	Shts	Document Change Description/Explanation
										- replace U5 and U11 to go from 3.0V to 3.3 V regulators - the previous evaluation remains representative
		D77	Assembly 900MHz DX DATA RADIO	137165	F	2	129333ASSY	D	2	- individual assembly documents for 900MHz and 2.4GHz radios replaced by one document covering all radio versions → no change to construction
		D78	Assembly 2.4GHz	140809	C	2				
		D79	BOM 900MHz DX DATA RADIO	137165BOM	F	7	129333BOM	D	9	- individual BOM documents for 900MHz and 2.4GHz radios replaced by one document covering all radio versions → no change to construction
		D80	BOM 2.4GHz	140809BOM	C	7				
						0				
Flex Boost Nodes	Main Board	D86	Raw PCB	127647	C	11	127647	D	11	- document change only → changed note 6 on page 11 from "FINISH PER BANNER ENGINEERING FLASH GOLD." to "FINISH PER BANNER ENGINEERING FINISH SPECIFICATION 120597 LATEST REV."
		D89	BOM	127647BOM	D	10	127647BOM	E	10	- document change only → increased raw PCB revision level
						0				
MGAGE Standard Nodes	Main Board	D111	Raw PCB	127993	D	9	127993	E	9	- document change only → changed note 6 on page 11 from "FINISH PER BANNER ENGINEERING FLASH GOLD." to "FINISH PER BANNER ENGINEERING FINISH SPECIFICATION 120597 LATEST REV." and changed note 8 on page 11 from "ALL VIAS SHOULD BE FULLY TINTED" to "ALL VIAS SHOULD BE FULLY TENTED" ("tented" means that the solder mask is left over the via instead of being cleared)
		D112	Schematic	131605	B	6	131605	D	6	- updated regulators U11, U12, and REG4 from 3.0V to 3.3V - the previous evaluation remains representative
		D113	900MHz Assembly MGAGE Radio	131362	D	2	127993ASSY	D	2	- individual assembly documents for 900MHz and 2.4GHz radios replaced by one document covering all radio versions → no change to construction
		D115	2.4GHz Assembly	131604	R1	2				
		D114	900MHz BOM MGAGE Radio	131362BOM	D	6	127993BOM	D	11	- individual assembly documents for 900MHz and 2.4GHz radios replaced by one document covering all radio versions → no change to construction
		D116	2.4GHz BOM	131604BOM	R1	6				
						0				
Battery Supply	Single Cell Board' Variant 1	D118	Schematic	130024	-	1	130024	A	1	- C103 (super capacitor) updated from 550mF to 900mF
		D119	Assembly	126235	-	1	126235	A	1	- the previous evaluation remains representative as this component is not in a non-incendive circuit
						0				
Spec Sheets	Spec Sheets	S7	Pluggable Term. Blocks – Molex 5.08mm pitch Plug	-	-	0	395300009	-	1	- these are spec sheets for alternative plug/header terminal blocks to be used on existing and new units - the following tests were deemed necessary: Pull Test - the new plug/header terminal blocks combinations were subject to a pull test under this project - refer to evaluation/test section below
		S8	Pluggable Term. Blocks – Molex 5.08mm pitch Header	-	-	0	395320009	-	1	
		S9	Pluggable Term. Blocks – General Molex Specification 3.50mm & 5.08mm	-	-	0	PS-39500-001	-	2	
		S10	Pluggable Term. Blocks – Molex 3.50mm pitch Plug	-	-	0	395000009	-	1	
		S11	Pluggable Term. Blocks – Molex 3.50mm pitch Header	-	-	0	395021009	-	1	
		S12	Pluggable Term. Blocks – OST Plug	-	-	0	OSTTJXX11530	-	1	
		S13	Pluggable Term. Blocks – OST Header	-	-	0	OSTOQXX1251	-	1	
		S14	Pluggable Term. Blocks – Phoenix Plug	-	-	0	1840434	-	1	
		S15	Pluggable Term. Blocks – Phoenix Header	-	-	0	1844281	-	1	
						0				
Radios	HS 900MHz 1Watt Radio	D126	Raw PCB	-	-	-	161303	A	8	- this is a new radio module which is used in High Speed Data Radio below - refer to High Speed Data Radio section below for evaluation
		D127	Schematic	-	-	-	161304	C	2	
		D128	Assembly	-	-	-	161305	B	1	
		D129	BOM	-	-	-	161305BOM	B	4	
		*	Dimension Drawing	-	-	-	137867	*		
				-	-	-				
HP 4422 Discrete/ Analog	Main Board	D130	Raw PCB	-	-	-	148594	B	11	- this wireless network controller version (a.k.a. high power/multi-hop) is a variant of the previously certified Mixed I/O version with: - the existing wiring board or new wiring board - new main PCB - existing 1W radio - previous "C" plastic enclosure - the previous evaluation remains representative due to the similarity in design as follows: Non-Incendive Evaluation - front panel push-button switches → same - front panel rotary switches → same - internal DIP switches → same - antenna → same Pull Test - ribbon cable glued → same Temperature - heat producing components → same
		D131	Schematic	-	-	-	148595	B	5	
		D132	Assembly	-	-	-	148594ASSY	A	2	
		D133	BOM	-	-	-	148594BOM	B	13	
		*	Dimension Drawing	-	-	-	125760	*		
	Wiring Board A, B	*	Raw PCB	-	-	-	139367	*		- this is the existing Mixed I/O wiring board
		*	Schematic	-	-	-	139369	*		
		*	Assembly	-	-	-	143727	*		
		*	BOM	-	-	-	143727BOM	*		
		*	Dimension Drawing	-	-	-	134266	*		
	Wiring Board Ext 4422 P2	D134	Raw PCB	-	-	-	161972	A	5	- this is a new wiring board - the previous evaluation remains representative due to the similarity in design as follows: Pull Test - ribbon cable glued → same - the following tests were deemed necessary: Pull Test - the new plug/header terminal blocks combinations were subject to a pull test under this project - refer to evaluation/test section below
		D135	Schematic	-	-	-	161973	B	1	
		D136	Assembly	-	-	-	161974	A	1	
		D137	BOM	-	-	-	161974BOM	A	1	
		*	Dimension Drawing	-	-	-	134266	*	1	

Component	Function	Item	Subject	Existing Drawing Document No.	Rev.	Shts	New Drawing Document No.	Rev.	Shts	Document Change Description/Explanation
FLEX HP W/Boost	Main Board	D138	Raw PCB	-	-	-	147932	B	11	- this wireless network controller version is a variant of the previously certified Flex Boost Node with: - the existing wiring board or one of two new wiring boards - new main PCB - existing 1W radio - previous "C" plastic enclosure or new "environmental enclosure" Note: the new "environmental enclosure" still must be installed in an IP54 enclosure - the previous evaluation remains representative due to the similarity in design as follows: Non-Incendive Evaluation - front panel push-button switches → same - front panel rotary switches → same - internal DIP switches → same - antenna → same Pull Test - ribbon cable glued → same Temperature - heat producing components → same
		D139	Schematic	-	-	-	147933	I	11	
		D140	Assembly	-	-	-	147932ASSY	B	2	
		D141	BOM	-	-	-	147932BOM	B	14	
		*	Dimension Drawing	-	-	-	125760	*		
	Wiring Board	*	Raw PCB	-	-	-	142974	*		- this is the existing Flex Boost Node wiring board
		*	Schematic	-	-	-	142976	*		
		*	Assembly	-	-	-	142975	*		
		*	BOM	-	-	-	142975BOM	*		
		*	Dimension Drawing	-	-	-	134266	*		
	P1,P5 Wiring Board	D142	Raw PCB	-	-	-	172051	A	5	- this is a new wiring board - the previous evaluation remains representative due to the similarity in design as follows: Pull Test - ribbon cable glued → same - the following tests were deemed necessary: Pull Test - the new plug/header terminal blocks combinations were subject to a pull test under this project
		D143	Schematic	-	-	-	172052	A	1	
		D144	Assembly	-	-	-	172053	A	1	
		D145	BOM	-	-	-	172053BOM	A	1	
		D146	Assembly	-	-	-	176857	A	1	
		D147	BOM	-	-	-	176857BOM	A	1	
		*	Dimension Drawing	-	-	-	134266	*		
	ENV Wiring Board	D148	Raw PCB	-	-	-	155782	A	5	- this is a new wiring board (Environmental Wiring Board) - the previous evaluation remains representative due to the similarity in design as follows: Pull Test - ribbon cable glued → same - terminal blocks are fixed type (not plug/header type) - the following tests were deemed necessary: Pull Test - pull test on Xeno Lithium cell in metal cell holder done under this project - refer to evaluation/test section below
		D149	Schematic	-	-	-	155783	A	1	
		D150	Assembly	-	-	-	155782ASSY	A	1	
		D151	BOM	-	-	-	155782BOM	A	1	
		D152	Dimension Drawing	-	-	-	155781	A	1	
HP Flex Instrum.	Main Board	D153	Raw PCB	-	-	-	148133	A	11	- this wireless network controller version is a variant of the previously certified Flex Instrumentation Nodes with: - the existing wiring board or one of two new wiring boards - new main PCB - existing 1W radio - previous "A" IP67 plastic enclosure or new "environmental enclosure" Note: the previous "A" IP67 plastic enclosure and new "environmental enclosure" still must be installed in an IP54 enclosure - the previous evaluation remains representative due to the similarity in design as follows: Non-Incendive Evaluation - front panel push-button switches → same - front panel rotary switches → same - internal DIP switches → same - antenna → same Pull Test - ribbon cable glued → same Temperature - heat producing components → same
		D154	Schematic	-	-	-	148134	D	8	
		D155	Assembly	-	-	-	148133ASSY	A	2	
		D156	BOM	-	-	-	148133BOM	A	12	
		*	Dimension Drawing	-	-	-	125760	*		
	Wiring Board	*	Raw PCB	-	-	-	142980	*		- this is the Existing Flex instrumentation Node wiring board
		*	Schematic	-	-	-	142982	*		
		*	Assembly	-	-	-	142981	*		
		*	BOM	-	-	-	142981BOM	*		
		*	Dimension Drawing	-	-	-	134266	*		
	DX81 Battery W20 Wiring Board	D158	Raw PCB	-	-	-	180333	A	6	- this is one of the new wiring boards - the previous evaluation remains representative due to the similarity in design as follows: Pull Test - ribbon cable glued → same - pull test on Xeno Lithium cell in plastic cell holder previously done under project 2095494 - external connection made via a connector threaded into the enclosure NPT entry (the connector is secured with threaded screw collar) - no terminal blocks
		D159	Schematic	-	-	-	180334	A	1	
		D160	Assembly	-	-	-	180333ASSY	A	2	
		D161	BOM	-	-	-	180333BOM	A	1	
		*	Dimension Drawing	-	-	-	134266	*		
	ENV Wiring Board	D163	Raw PCB	-	-	-	156189	A	5	- this is a new wiring board (Environmental Wiring Board) - the previous evaluation remains representative due to the similarity in design as follows: Pull Test
		D164	Schematic	-	-	-	156190	A	1	
		D165	Assembly	-	-	-	156191	A	1	
		D166	BOM	-	-	-	156191BOM	A	1	

Component	Function	Item	Subject	Existing Drawing Document No.	Rev.	Shts	New Drawing Document No.	Rev.	Shts	Document Change Description/Explanation
		*	Dimension Drawing	-	-	-	155781	*		- ribbon cable glued → same - terminal blocks are fixed type (not plug/header type) - the following tests were deemed necessary: Pull Test - pull test on Xeno Lithium cell in metal cell holder to be done - refer to evaluation/test section below
Flex 12 IO NPN	Main Board	D167	Raw PCB	-	-	-	148980	B	11	- this wireless network controller version is a variant of the previously certified Digital I/O version (in this one, each I/O can be individually selected as an input or output through firmware) with: - the existing wiring board - new main PCB - existing 1W radio - previous "C" plastic enclosure - the previous evaluation remains representative due to the similarity in design as follows: Non-Incendive Evaluation - front panel push-button switches → same - front panel rotary switches → same - internal DIP switches → same - antenna → same Pull Test - ribbon cable glued → same Temperature - heat producing components → same
		D168	Schematic	-	-	-	148981	E	5	
		D169	Assembly	-	-	-	148980ASSY	B	2	
		D170	BOM	-	-	-	148980BOM	B	10	
		*	Dimension Drawing	-	-	-	125760	*		
	Wiring Board	*	Raw PCB	-	-	-	142974	*		- this is the existing Flex Boost Node wiring board
		*	Schematic	-	-	-	142976	*		
		*	Assembly	-	-	-	142975	*		
		*	BOM	-	-	-	142975BOM	*		
		*	Dimension Drawing	-	-	-	134266	*		
FLEX 12 IO PNP	Main Board	D171	Raw PCB	-	-	-	155014	A	11	- this wireless network controller version is a variant of the previously certified Digital I/O version (in this one, each I/O can be individually selected as an input or output through firmware), with: - the existing wiring board or a new wiring board - new main PCB - existing 1W radio - previous "C" plastic enclosure - the previous evaluation remains representative due to the similarity in design as follows: Non-Incendive Evaluation - front panel push-button switches → same - front panel rotary switches → same - internal DIP switches → same - antenna → same Pull Test - ribbon cable glued → same Temperature - heat producing components → same
		D172	Schematic	-	-	-	155015	F	8	
		D173	Assembly	-	-	-	155014ASSY	A	2	
		D174	BOM	-	-	-	155014BOM	B	11	
		*	Dimension Drawing	-	-	-	125760			
	Wiring Board	*	Raw PCB	-	-	-	139367	*		- this is the existing Mixed I/O wiring board
		*	Schematic	-	-	-	139369	*		
		*	Assembly	-	-	-	143727	*		
		*	BOM	-	-	-	143727BOM	*		
		*	Dimension Drawing	-	-	-	134266			
	PM Wiring Board	*	Raw PCB	-	-	-	161972	*		- this is a new wiring board - the previous evaluation remains representative due to the similarity in design as follows: Pull Test - ribbon cable glued → same - the following tests were deemed necessary: Pull Test - the new plug/header terminal blocks combinations were subject to a pull test under this project - refer to evaluation/test section below
		*	Schematic	-	-	-	161973	*		
		D175	Assembly	-	-	-	175079	A	1	
		D176	BOM	-	-	-	175079BOM	A	1	
		*	Dimension Drawing	-	-	-	134266	A	1	
High Speed Data Radio	Main Board	D177	Raw PCB	-	-	-	147324	C	9	- this wireless network controller version is completely new model which can be used as a "RF wire replacement" - it consists of: - a new LAN wiring board or a new serial wiring board - new main PCB - the new HS 900MHz 1Watt Radio module - previous "C" plastic enclosure - look at LAN jack, push-buttons, DIP switches, jumpers, look at micro SD card slot - the following tests were deemed necessary: Rating Test - refer to evaluation/test section below Non-Incendive Evaluation - refer to evaluation/test section below Pull Test - refer to evaluation/test section below Temperature Test - refer to evaluation/test section below
		D178	Schematic	-	-	-	147325	E	5	
		D179	Assembly	-	-	-	147324ASSY	C	2	
		D180	BOM	-	-	-	147324BOM	C	9	
		*	Dimension Drawing	-	-	-	125760	*		
	LAN Wiring Board	D182	Raw PCB	-	-	-	180837	A	11	- this is a new wiring board - the following tests were deemed necessary: Non-Incendive Evaluation - refer to evaluation/test section below
		D183	Schematic	-	-	-	180838	A	7	
		D184	Assembly	-	-	-	180839	B	2	
		D185	BOM	-	-	-	180839BOM	B	10	

Component	Function	Item	Subject	Existing Drawing Document No.	Rev.	Shts	New Drawing Document No.	Rev.	Shts	Document Change Description/Explanation
		*	Dimension Drawing	-	-	-	134266	*		Pull Test - refer to evaluation/test section below Temperature Test - refer to evaluation/test section below
	Serial Wiring Board	D186	Raw PCB	-	-	-	169134	A	5	- this is a new wiring board
		D187	Schematic	-	-	-	169135	A	1	- the previous evaluation remains representative due to the similarity in design as follows: Non-Incendive Evaluation - there are no non-incendive circuits Pull Test - ribbon cable glued → same - terminal blocks are fixed type (not plug/header type) Temperature Test - there are no heat producing components
		D188	Assembly	-	-	-	169136	A	1	
		D189	BOM	-	-	-	169136BOM	A	1	
		*	Dimension Drawing	-	-	-	134266	*		
HB1 Flex 222 2SWP	Main Board	D190	Raw PCB	-	-	-	154708	B	9	- this wireless network controller version is a low cost variant of the previously certified Flex Boost Node with: - the wiring board and the main board being combined - no LCD display - only one push-button - direct soldered terminal block (not plug/header type) - existing 1W radio - line powered or battery powered - new plastic enclosure - the previous evaluation remains representative due to the similarity in design as follows: Non-Incendive Evaluation - front panel push-button switch → same - front panel rotary switches → same - front panel DIP switches → same - antenna → same Pull Test - terminal blocks are fixed type (not plug/header type) Temperature - heat producing components → same
		D191	Schematic	-	-	-	154709	D	6	
		D192	Assembly	-	-	-	154708ASSY	B	2	
		D193	BOM	-	-	-	154708BOM	B	8	
		D194	Dimension Drawing	-	-	-	157052	A	1	
HB2 Flex 222 2AOT	Main Board	D195	Raw PCB	-	-	-	163673	A	9	- this wireless network controller version is a low cost variant of the previously certified Flex Boost Node with: - the wiring board and the main board being combined - no LCD display - only one push-button - direct soldered terminal block (not plug/header type) - existing 1W radio - battery powered only - new plastic enclosure - the previous evaluation remains representative due to the similarity in design as follows: Non-Incendive Evaluation - front panel push-button switch → same - front panel rotary switches → same - front panel DIP switches → same - antenna → same Pull Test - terminal blocks are fixed type (not plug/header type) Temperature - heat producing components → same
		D196	Schematic	-	-	-	163675	C	7	
		D197	Assembly	-	-	-	163673ASSY	A	2	
		D198	BOM	-	-	-	163673BOM	A	9	
		*	Dimension Drawing	-	-	-	157052	*		
Battery Supply	Single Cell Board Variant 2	D199	Raw PCB	-	-	-	173010	A	7	- this Battery Supply is a variant of the DX81 version with: - same Xeno Lithium cell - new electrolytic super-caps (2)installed on the circuit board instead of the soft-type super-cap - nothing else - previous DX81 "A" plastic enclosure - same flying lead terminated with a connector (the connector is secured with threaded screw collar) - the previous evaluation remains representative due to the similarity in design as follows: Non-Incendive Evaluation - none (there are no unsecured connectors, jumpers or normally arcing parts) Pull Test - pull test on Xeno Lithium cell in plastic cell holder previously done under project 2095494 Temperature - the only heat producing component is Xeno lithium cell → same
		D200	Schematic	-	-	-	173009	A	1	
		D201	Assembly	-	-	-	173553	A	1	
		D202	BOM	-	-	-	173553BOM	A	1	
		*	Dimension Drawing	-	-	-	134266	*		

Note: A "*" indicates that the drawing is already listed for another version.

EVALUATION/TESTS

The following was conducted under CSA Report 150323-1921239 (70012202) in consideration of the revised/new documents outlined above:

1. Temperature Code Rating IEC 60079-0:2007, Cl. 26.5.1.3

The test samples were operated under the worst case normal operating conditions. Component temperatures were measured by thermocouple applied directly the component surface. Ambient temperatures were measured by thermometer. These tests are representative for all of the other similar versions.

Model	Board	Component	Maximum Temperature (°C)	
			10Vdc	30Vdc
High Speed Data Radio	Main	L6	60.1	60.4
		U7	55.0	55.9
		L5	51.6	59.4
		D9	52.0	**60.5**
	LAN Wiring	IC9	46.3	47.0
		Ambient	24	24

Temperature Code Calculation

T = 60.5°C + (80°C - 24°C) = 116.5°C → Temperature Code T4 (135°C)

2. Pull Test IEC 60079-15:2010, Cl. 7.3.5 (a)

The applicable connectors (as listed below) were subjected to the 15N Pull Test in accordance with the referenced clause as recorded in the table below:

3. Evaluation of Non-Incendive Circuits: IEC 60079-15:2005, Cl. 33.6

The applicable circuits (as listed below) were assessed as essentially resistive low level in accordance with the referenced clause when compared to the published curves (Group IIC/ABCD).

Results:

Model	Board	Component	Pull Test		Non-Incendive Circuit
			Force	Pullout?	Voltage/Current/Power
All With "C" enclosure	Wiring	Molex terminal block plug w Molex header (5.08mm)	15N	No	-
		Molex terminal block plug w Amphenol header (5.08mm)	15N	No	-
		Amphenol terminal block plug w Molex header (5.08mm)	15N	No	-
		Amphenol terminal block plug w Amphenol header (5.08mm)	15N	No	-
		Molex terminal block plug w Molex header (3.50mm)	15N	No	-
		Molex terminal block plug w Phoenix Contact header (3.50mm)	15N	No	-
		Molex terminal block plug w O.S.T. header (3.50mm)	15N	No	-
		Phoenix Contact terminal block plug w Molex header (3.50mm)	15N	No	-
		Phoenix Contact terminal block plug w Phoenix Contact header (3.50mm)	15N	No	-
		Phoenix Contact terminal block plug w O.S.T. header (3.50mm)	15N	No	-
		O.S.T. terminal block plug w Molex header (3.50mm)	15N	No	-
		O.S.T. terminal block plug w Phoenix Contact header (3.50mm)	15N	No	-
		O.S.T. terminal block plug w O.S.T. header (3.50mm)	15N	No	-
Flex HP w Boost & HP Flex Inst.	ENV Wiring	Xeno lithium cell in metal battery holder	15N	No	-
High Speed Data Radio	Main	Front Panel Push-Button Switches	-	-	3.3Vdc / 330µA (3.3Vdc through 10KΩ)
		Front Panel Rotary Switches	-	-	3.3Vdc / 330µA

Model	Board	Component	Pull Test		Non-Incendive Circuit
			Force	Pullout?	Voltage/Current/Power
		(installed for units using the LAN wiring board)			(3.3Vdc through 10KΩ)
		SW3 (installed for units using the serial wiring board)	-	-	3.3Vdc / 330µA (3.3Vdc through 10KΩ)
		Internal DIP Switches	-	-	3.3Vdc / 330µA (3.3Vdc through 10KΩ)
		Jumper JP1 on P14 pins 1 & 2 or 2 & 3 Jumper JP2 on P13 pins 2 & 4 or 4 & 6 Jumper JP3 on P13 pins 1 & 3 or 3 & 5	10x mass	No	-
		RF	-	-	30dBm / 1W w new HS 900MHz 1W radio module
		Ribbon Cable Connector P7 → glued and previously pull tested	-	-	-
		Programming Connectors P4 & P8→ programming only	-	-	-
	LAN Wiring	Jumper J3 on P14 pins 1 & 3 or 3 & 5 Jumper J4 on P14 pins 2 & 4 or 4 & 6	10x mass	No	-
		Battery B1 → soldered	-	-	-
		Micro SD Card	10x mass	No	-
		Jumper J5 on P33 pins 1 & 2 or 2 & 3	10x mass	No	-
		LAN Jack J1 → mechanically secured	-	-	-
		Internal DIP Switches SW1	-	-	3.3Vdc / 33µA (3.3Vdc through 100KΩ)
		Push Button Switch SW2	-	-	3.3Vdc / 330µA (3.3Vdc through 10KΩ)
		Ribbon Cable Connector P9 → glued and previously pull tested	-	-	-
		Programming Connectors P11→ programming only	-	-	-
		USB Connector → no connection in the Hazardous Location	-	-	-

DRAWINGS

Refer to Technical File Doc. No. B_083186 Rev. 5.

MARKINGS

No change.

SPECIAL CONDITIONS FOR SAFE OPERATION (X MARKING)

No change.

CONCLUSIONS

The results of this investigation show that this equipment or system meets the construction and test requirements of the standard:

- EN 60079-0:2006
- EN 60079-15:2005
- EN 60079-31:2008

Kitchener, ON Canada, July 4, 2015

Grant Lewis, President
ExProtec Consulting Inc.

Fontenay-aux-Roses,

Reviewed by,

ATEX Assessment Officer

Approved by,

ATEX Certification Manager

	AUDITOR: Grant Lewis	**DATE:** July 4, 2015

TECHNICAL FILE

Banner Engineering Corporation

Wireless Network Controller Models
DX70…**C**, DX80…, DX80…**C**, DX85…**C** and DX80...**E**
(Plastic Enclosure Versions)
with DX81 FlexPower Battery Supply
and
DX80…**B**
(Metallic Enclosure Version)

Vérifié et Certifié conforme à l'execution

le: May 15, 2015
Nom: Roger Eagle
Fonction: Regulatory Compliance Manager Signature:

CERTIFIÉ CONFORME
À L'EXÉCUTION
Signature Roger Eagle
Date 5/15/15

Rév	Date	Objet
5	May 15, 2015	Addition of Model DX80...E, addition of Variants of Existing Models and document revisions
4	Nov. 6, 2012	Updated to show new document revision
3	Feb. 15, 2011	Updated to show new document revisions
2	Feb. 09, 2009	Emission du document

DOCUMENT ANNEXE
LCIE N° 136450-674122-2
LCIE Vérifié le 16/02/2016
Nom SANTOS ALVAREZ Visa :

Banner Engineering DX70/80/85 Documents						
Component	Function	Item	Subject	Document No.	Rev.	Sheets
Common Drawings	Common Drawings	C1	LCIE Technical File	B_083186	5	7
		C2	LCIE Descriptive Notice	B_083190	3	10
		C3	Label Drawing	134430	C	9
		C4	DX8x Control Drawing	143086	B	58
		C5	Document Map	134429	D	13
		C7	Exploded Mechanical View	134431	E	19
		C8	Enclosure Dimensions	134432	C	15
		C9	Limatherm Technical Document	B_083040	1	9
		C10	Connector Gluing	134433	B	4
						0
Radios	900MHz Radio	D1	Raw PCB	122977	A	8
		D2	Schematic	127269	A	2
		D3	Assembly	122978	B	1
		D4	BOM	122978BOM	B	3
		D5	Dimension Drawing	127738	A	1
	2.4GHz Radio	D6	Raw PCB	128446	A	8
		D7	Schematic	129790	-	2
		D8	Assembly	128953	B	1
		D9	BOM	128953BOM	B	3
		*	Dimension Drawing	127738	*	0
	1Watt Radio	D10	Raw PCB	127827	C	8
		D11	Schematic	135496	B	2
		D12	Assembly	127767	B	1
		D13	BOM	127767BOM	B	3
		D14	Dimension Drawing	137867	-	1
	HS 900MHz 1Watt Radio	D126	Raw PCB	161303	A	8
		D127	Schematic	161304	C	2
		D128	Assembly	161305	B	1
		D129	BOM	161305BOM	B	4
		*	Dimension Drawing	137867	*	0
						0
Mixed I/O	Main Board	D15	Raw PCB	126989	E	11
		D16	Schematic	128652	L	6
		D17	Assembly	126989ASSY	D	2
		D18	BOM	126989BOM	E	12
		D19	Dimension Drawing	125760	-	1
	Wiring Board A, B	D20	Raw PCB	132145	A	6
		D21	Schematic	132147	B	1
		D22	Assembly Lever	132146	A	1
		D23	Assembly Screw	133852	-	1
		D24	BOM	133852BOM	-	1
		D25	Dimension Drawing	133510	-	1
	Wiring Board C	D26	Raw PCB	139367	A	6
		D27	Schematic	139369	A	1
		D28	Assembly	143727	A	1
		D29	BOM	143727BOM	A	1
		D30	Dimension Drawing	134266	-	1
	Wiring Board Weatherford	D122	Raw PCB	176216	A	7
		D123	Schematic	176217	A	1
		D124	Assembly	176218	1	1
		D125	BOM	176218BOM	1	1
		*	Dimension Drawing	134266	*	0
						0
Analog I/O	Main Board	D31	Raw PCB	131558	C	11
		D32	Schematic	137669	F	6
		D33	Assembly	131558ASSY	B	2
		D34	BOM	131558BOM	E	12

Banner Engineering DX70/80/85 Documents						
Component	Function	Item	Subject	Document No.	Rev.	Sheets
		*	Dimension Drawing	125760	*	0
	Wiring Board A, B	D35	Raw PCB	133420	-	6
		D36	Schematic	133422	A	1
		D37	Assembly Lever	133421	R1	1
		D38	Assembly Screw	133981	-	1
		D39	BOM	133981BOM	-	1
		*	Dimension Drawing	133510	-	0
	Wiring Board C	D40	Raw PCB	139379	A	6
		D41	Schematic	139381	B	1
		D42	Assembly	143731	A	1
		D43	BOM	143731BOM	A	1
		*	Dimension Drawing	134266	*	0
						0
Digital I/O	Main Board	D44	Raw PCB	130122	D	11
		D45	Schematic	131689	H	10
		D46	Assembly	130122ASSY	C	2
		D47	BOM	130122BOM	E	11
		*	Dimension Drawing	125760	*	0
	6600 Wiring Board A, B	D48	Raw PCB	132134	A	6
		D49	Schematic	132138	B	1
		D50	Assembly Lever	133853	R1	1
		D51	Assembly Screw	132135	B	1
		D52	BOM	132134BOM	-	1
		*	Dimension Drawing	133510	*	0
	6600 Wiring Board C	D53	Raw PCB	139376	A	6
		D54	Schematic	139378	B	1
		D55	Assembly	143730	A	1
		D56	BOM	143730BOM	A	1
		*	Dimension Drawing	134266	*	0
	8400 Wiring Board A, B	D57	Raw PCB	132139	-	6
		D58	Schematic	132141	A	1
		D59	Assembly Lever	132140	R1	1
		D60	Assembly Screw	133850	-	1
		D61	BOM	133850BOM	-	1
		*	Dimension Drawing	133510	*	0
	8400 Wiring Board C	D62	Raw PCB	139370	A	6
		D63	Schematic	139372	B	1
		D64	Assembly	143728	A	1
		D65	BOM	143728BOM	A	1
		*	Dimension Drawing	134266	*	0
	4800 Wiring Board A, B	D66	Raw PCB	132142	-	6
		D67	Schematic	132144	A	1
		D68	Assembly Lever	132143	R1	1
		D69	Assembly Screw	133851	-	1
		D70	BOM	133851BOM	-	1
		*	Dimension Drawing	133510	*	0
	4800 Wiring Board C	D71	Raw PCB	139373	A	6
		D72	Schematic	139375	B	1
		D73	Assembly	143729	A	1
		D74	BOM	143729BOM	A	1
		*	Dimension Drawing	134266	*	0
						0
Flex Gateway and Data Radio	Main Board	D75	Raw PCB	129333	D	11
		D76	Schematic	135497	H	4
		D77	Assembly DX DATA RADIO	129333ASSY	D	2
		D79	BOM DX DATA RADIO	129333BOM	D	9
		*	Dimension Drawing	125760	*	0
						0

Banner Engineering DX70/80/85 Documents						
Component	Function	Item	Subject	Document No.	Rev.	Sheets
Mini DIN Wiring Board	Wiring Board	D81	Raw PCB	130587	-	5
		D82	Schematic	130711	-	1
		D83	Assembly	130588	-	1
		D84	BOM	150588BOM	-	1
		D85	Dimension Drawing	130710	-	1
						0
Flex Boost Nodes	Main Board	D86	Raw PCB	127647	D	11
		D87	Schematic	129223	J	5
		D88	Assembly	127647ASSY	C	2
		D89	BOM	127647BOM	E	10
		*	Dimension Drawing	125760	*	0
	Wiring Board	D90	Raw PCB	142974	A	6
		D91	Schematic	142976	A	1
		D92	Assembly	142975	A	1
		D93	BOM	142975BOM	A	1
		D94	Dimension Drawing	134266	A	1
						0
Flex 4400 Nodes	Main Board	D95	Raw PCB	135289	B	9
		D96	Schematic	135291	D	6
		D97	Assembly	135289ASSY	B	2
		D98	BOM	135289BOM	C	10
		*	Dimension Drawing	125760	*	0
	Wiring Board	D99	Raw PCB	142977	A	6
		D100	Schematic	142979	A	1
		D101	Assembly	142978	A	1
		D102	BOM	142978BOM	A	1
		*	Dimension Drawing	134266	*	0
						0
Flex Instrumentation Nodes	Main Board	D103	Raw PCB	128565	B	11
		D104	Schematic	129224	G	8
		D105	Assembly	128565ASSY	B	2
		D106	BOM	128565BOM	C	12
		*	Dimension Drawing	125760	*	0
	Wiring Board	D107	Raw PCB	142980	A	6
		D108	Schematic	142982	A	1
		D109	Assembly	142981	A	1
		D110	BOM	142981BOM	A	1
		*	Dimension Drawing	134266	*	0
						0
MGAGE Standard Nodes	Main Board	D111	Raw PCB	127993	E	9
		D112	Schematic	131605	D	6
		D113	Assembly MGAGE Radio	127993ASSY	D	2
		D114	BOM MGAGE Radio	127993BOM	D	11
		*	Dimension Drawing	125760	*	0
						0
Battery Supply	Single Cell Board Variant 1	D117	Raw PCB	126234	-	6
		D118	Schematic	130024	A	1
		D119	Assembly	126235	A	1
		D120	BOM	126235BOM	-	1
		D121	Dimension Drawing	130023	-	1
	Single Cell Board Variant 2	D199	Raw PCB	173010	A	7
		D200	Schematic	173009	A	1
		D201	Assembly	173553	A	1
		D202	BOM	173553BOM	A	1
		*	Dimension Drawing	134266	*	0
						0
HP 4422 Discrete/	Main Board	D130	Raw PCB	148594	B	11
		D131	Schematic	148595	B	5

Banner Engineering DX70/80/85 Documents						
Component	Function	Item	Subject	Document No.	Rev.	Sheets
Analog		D132	Assembly	148594ASSY	A	2
		D133	BOM	148594BOM	B	13
		*	Dimension Drawing	125760	*	0
	Wiring Board A, B	*	Raw PCB	139367	*	0
		*	Schematic	139369	*	0
		*	Assembly	143727	*	0
		*	BOM	143727BOM	*	0
		*	Dimension Drawing	134266	*	0
	Wiring Board Ext 4422 P2	D134	Raw PCB	161972	A	5
		D135	Schematic	161973	B	1
		D136	Assembly	161974	A	1
		D137	BOM	161974BOM	A	1
		*	Dimension Drawing	134266	*	1
						0
FLEX HP W/Boost	Main Board	D138	Raw PCB	147932	B	11
		D139	Schematic	147933	I	11
		D140	Assembly	147932ASSY	B	2
		D141	BOM	147932BOM	B	14
		*	Dimension Drawing	125760	*	0
	Wiring Board	*	Raw PCB	142974	*	0
		*	Schematic	142976	*	0
		*	Assembly	142975	*	0
		*	BOM	142975BOM	*	0
		*	Dimension Drawing	134266	*	0
	P1,P5 Wiring Board	D142	Raw PCB	172051	A	5
		D143	Schematic	172052	A	1
		D144	Assembly	172053	A	1
		D145	BOM	172053BOM	A	1
		D146	Assembly	176857	A	1
		D147	BOM	176857BOM	A	1
		*	Dimension Drawing	134266	*	0
	ENV Wiring Board	D148	Raw PCB	155782	A	5
		D149	Schematic	155783	A	1
		D150	Assembly	155782ASSY	A	1
		D151	BOM	155782BOM	A	1
		D152	Dimension Drawing	155781	A	1
						0
HP Flex Instrum.	Main Board	D153	Raw PCB	148133	A	11
		D154	Schematic	148134	D	8
		D155	Assembly	148133ASSY	A	2
		D156	BOM	148133BOM	A	12
		*	Dimension Drawing	125760	*	0
	Wiring Board	*	Raw PCB	142980	*	0
		*	Schematic	142982	*	0
		*	Assembly	142981	*	0
		*	BOM	142981BOM	*	0
		*	Dimension Drawing	134266	*	0
	DX81 Battery W20 Wiring Board	D158	Raw PCB	180333	A	6
		D159	Schematic	180334	A	1
		D160	Assembly	180333ASSY	A	2
		D161	BOM	180333BOM	A	1
		*	Dimension Drawing	134266	*	0
	ENV Wiring Board	D163	Raw PCB	156189	A	5
		D164	Schematic	156190	A	1
		D165	Assembly	156191	A	1
		D166	BOM	156191BOM	A	1
		*	Dimension Drawing	155781	*	0
						0

Banner Engineering DX70/80/85 Documents						
Component	Function	Item	Subject	Document No.	Rev.	Sheets
Flex 12 IO NPN	Main Board	D167	Raw PCB	148980	B	11
		D168	Schematic	148981	E	5
		D169	Assembly	148980ASSY	B	2
		D170	BOM	148980BOM	B	10
		*	Dimension Drawing	125760	*	0
	Wiring Board	*	Raw PCB	142974	*	0
		*	Schematic	142976	*	0
		*	Assembly	142975	*	0
		*	BOM	142975BOM	*	0
		*	Dimension Drawing	134266	*	0
FLEX 12 IO PNP	Main Board	D171	Raw PCB	155014	A	11
		D172	Schematic	155015	F	8
		D173	Assembly	155014ASSY	A	2
		D174	BOM	155014BOM	B	11
		*	Dimension Drawing	125760		0
	Wiring Board	*	Raw PCB	139367	*	0
		*	Schematic	139369	*	0
		*	Assembly	143727	*	0
		*	BOM	143727BOM	*	0
		*	Dimension Drawing	134266		0
	PM Wiring Board	*	Raw PCB	161972	*	0
		*	Schematic	161973	*	0
		D175	Assembly	175079	A	1
		D176	BOM	175079BOM	A	1
		*	Dimension Drawing	134266	*	0
						0
High Speed Data Radio	Main Board	D177	Raw PCB	147324	C	9
		D178	Schematic	147325	E	5
		D179	Assembly	147324ASSY	C	2
		D180	BOM	147324BOM	C	9
		*	Dimension Drawing	125760	*	0
	LAN Wiring Board	D182	Raw PCB	180837	A	11
		D183	Schematic	180838	A	7
		D184	Assembly	180839	B	2
		D185	BOM	180839BOM	B	10
		*	Dimension Drawing	134266	*	0
	Serial Wiring Board	D186	Raw PCB	169134	A	5
		D187	Schematic	169135	A	1
		D188	Assembly	169136	A	1
		D189	BOM	169136BOM	A	1
		*	Dimension Drawing	134266	*	0
						0
HB1 Flex 222 2SWP	Main Board	D190	Raw PCB	154708	B	9
		D191	Schematic	154709	D	6
		D192	Assembly	154708ASSY	B	2
		D193	BOM	154708BOM	B	8
		D194	Dimension Drawing	157052	A	1
						0
HB2 Flex 222 2AOT	Main Board	D195	Raw PCB	163673	A	9
		D196	Schematic	163675	C	7
		D197	Assembly	163673ASSY	A	2
		D198	BOM	163673BOM	A	9
		*	Dimension Drawing	157052	*	0
						0
Other Docs	Other Docs	O1	CSA Lab Work Order - DX70/80/85	150323-2095494	-	0
		O2	CSA Test Report - DX91-D2 (for reference)	150323-1921239	-	0

Banner Engineering DX70/80/85 Documents						
Component	Function	Item	Subject	Document No.	Rev.	Sheets
		O3	CSA Test Report - DX99-D1/Z0 (for reference)	150323-2008243	-	0
		O4	CSA Limatherm Enclosure Certificate	231723-1823706	-	0
		O5	FM Limatherm Enclosure Certificate	3026118	-	0
		O6	ATEX Limatherm Enclosure Certificate	FTZU 04 ATEX 0332U	-	0
						0
Spec Sheets	Spec Sheets	S1	Plastic Housing Material	-	-	0
		S2	Connector Cement - Resin Technology Group LLC OXY-BOND 119EX Epoxy	-	-	0
		S3	XENO XL-205F Lithium Cell	-	-	0
		S4	Pluggable Terminal Blocks	-	-	0
		S5	Connector Cement - EFI 30030-40031	-	-	0
		S6	Connector Cement - URA-BOND 21-MVNA	-	-	0
		S7	Pluggable Term. Blocks – Molex 5.08mm pitch Plug	395300009	-	0
		S8	Pluggable Term. Blocks – Molex 5.08mm pitch Header	395320009	-	0
		S9	Pluggable Term. Blocks – General Molex Specification 3.50mm & 5.08mm	PS-39500-001	-	0
		S10	Pluggable Term. Blocks – Molex 3.50mm pitch Plug	395000009	-	0
		S11	Pluggable Term. Blocks – Molex 3.50mm pitch Header	395021009	-	0
		S12	Pluggable Term. Blocks – OST Plug	OSTTJXX11530	-	0
		S13	Pluggable Term. Blocks – OST Header	OSTOQXX1251	-	0
		S14	Pluggable Term. Blocks – Phoenix Plug	1840434	-	0
		S15	Pluggable Term. Blocks – Phoenix Header	1844281	-	0
						0
						0

Total Items: 211

Total Sheets: 932

Drawing List Notes:

1. A "*" indicates that the drawing is already listed for another version. It is included for clarity, but is not counted in the numbering of the items or sheets.

2. A "**" indicates supplementary information (e.g. spec sheets, certificates, test reports) which is not counted in the numbering of the items or sheets.

DESCRIPTIVE NOTICE

Banner Engineering Corporation

Wireless Network Controller Models DX70…**C**, DX80…, DX80…**C**, DX80…**E** and DX85…**C** (Plastic Enclosure Versions) with DX81 FlexPower Battery Supply and DX80…**B** (Metallic Enclosure Version)

1. Standards

- EN 60079-0:2006
- EN 60079-15:2005
- EN 61241-0:2006
- EN 61241-1:2004

2. ATEX Classification and Protection Type

Model	ATEX Classification	Protection Type(s)	Group	Temperature Class
DX70…**C**, DX80…, DX80…**C**, DX80…**E**, DX85…**C** (Plastic Enclosure Version)	II 3 G	**Ex nA**	IIC	T4 (Ta = -40°C to +80°C)
DX80…**B** (Metallic Enclosure Version)	II 3 G D	**Ex nA** **Ex tc**	IIC IIIC	T4 (Ta = -40°C to +80°C) T92°C (Ta = -40°C to +80°C)

3. Normal Electrical Rating

Version	Rating
DX81, DX80 internal battery	3.6Vdc
DX80DR, DX80-C flex power	3.6V to 5Vdc, or 10V to 30Vdc
DX80-E flex power, internal battery	3.6V to 5Vdc, or 10V to 30Vdc
DX70, DX85, DX80 10-30	10V to 30Vdc

4. Description

4.1 General

All DX70/80/85 versions contain an internal wiring circuit board and a main circuit board. The main circuit board for all DX70/80 versions are equipped with a radio sub-board which is used for the wireless communications. DX85 models are not equipped with a radio and are intended to be used as i/o expansion devices through a serial link.

The main circuit board is mounted in the cover of the plastic enclosure. A 0.9mm thick nominal polycarbonate plate (solid insulation) covers the main circuit board of all units preventing the internal wiring board ribbon cable from coming into contact with any of its components or printed wiring tracks.

In the case of the metallic enclosure version, the cover of the plastic enclosure with the main board assembly is mounted in the front compartment (with window) of the Limatherm enclosure.

Refer to Descriptive Documents for complete details.

4.2 Model Numbering Scheme

The Wireless Network Controllers are available in the following versions:

- DX70…**C**, DX80…, DX80…**C**, DX80…**E** and DX85…**C** (Plastic Enclosure Versions) with DX81 FlexPower Battery Supply
- DX80…**B** (Metallic Enclosure Version)

Specific model number breakdown is shown below:

4.2.1 Model DX70

Example model number

Digits Place	1-4	5	6	7	8	9	10	11	12	13	14	15	16	17	18-19
Value	DX70	G	9	X	6	S	4	P	4	M	2	M	2	C	-FR

Digit	Description	Options
1-4	Model	DX70
5	Device	G: Gateway N: Node
6	Radio frequency	2: 2.4 GHz 9: 900 MHz
7	Host communication type	X: None
8	Power type	6: 10–30V dc
9	Antenna	S: External W: Internal
10	Discrete input quantity	0, 2, 4, 8
11	Discrete type	P: Sourcing (PNP) N: Sinking (NPN)
12	Discrete output quantity	0, 2, 4, 8
13	Analog input type	M: 0–20 mA V: 0–10V dc
14	Analog input quantity	0, 2, 4
15	Analog output type	M: 0–20 mA V: 0–10V dc X: None
16	Analog output quantity	0, 2, 4
17	Housing type	C: IP20 Base Blank: IP67 Base
18-19	Country code	-FR: France

4.2.2 Model DX80

Example model number

Digits Place	1-4	5	6	7	8	9	10	11	12	13	14	15	16	17	18-19
Value	DX80	G	9	M	6	S	4	P	4	M	2	M	2	C	-FR

Digit	Description	Options
1-4	Model	DX80
5	Device	C: Custom software G: Gateway N: Node
6	Radio frequency	2: 2.4 GHz 9: 900 MHz
7	Host communication type	C: Custom E: EtherNet/IP M: Modbus RS-485 T: Modbus/TCP X: None
8	Power type	1: FlexPower, internal battery 2: FlexPower, no internal battery 6: 10–30V dc
9	Antenna	S: External W: Internal X: No antenna
10	Discrete input quantity	0, 1, 2, 4, 6, 8
11	Discrete type	A: Async counter K: K50 EZ-LIGHT N: Sinking (NPN) P: Sourcing (PNP) S: Serial interface
12	Discrete output quantity	0, 2, 4, 6, 8
13	Analog input type	B: Bridge M: 0–20 mA R: RTD T: Thermocouple U: T30U Ultrasonic V: 0–10V dc X: None Z: M-GAGE
14	Analog input quantity	0, 2, 4
15	Analog output type	M: 0–20 mA V: 0–10V dc X: None
16	Analog output quantity	0, 2, 4
17	Housing type	B: Metal housing C: IP20 Base Blank: IP67 Base
18-19	Country code or Special Order Number	-FR: France -#####: Special Order Number -NB: No battery (for internal battery models)

4.2.3 Model DX80 Performance Series

Example model number

Digits Place	1-4	5	6	7	8	9	10-13	14	15-19
Value	DX80	G	9	M	6	S	-PM8L	C	-FR

Digit	Description	Options
1-4	Model	DX80
5	Device	C: Custom software G: Gateway N: Node
6	Radio frequency	2: 2.4 GHz 9: 900 MHz
7	Host communication type	L: Low Cost M: Modbus RS-485 X: None
8	Power type	1: FlexPower, internal battery 2: FlexPower, no internal battery 6: 10–30V dc
9	Antenna	S: External W: Internal X: No antenna
10-13	I/O Configuration	-P: Serial RS485/RS232 -P1: FlexPower, 2 Discrete Inputs, 2 Discrete Outputs, 2 Analog Inputs, Boost Voltage -P2: 4 Discrete Inputs, 4 Discrete Outputs, 2 Analog Inputs, 2 Analog Outputs -P3: FlexPower, Thermocouple -P4: FlexPower, RTD -P5: FlexPower, 2 Discrete Inputs, 2 Discrete Outputs, 4 Analog Inputs -P6: Serial Interface -P7: FlexPower, 12 Selectable Discrete Sinking Inputs/Outputs -P8: 12 Selectable Discrete Sourcing Inputs/Outputs -P12: FlexPower, SDI-12 Interface, H-Bridge Interface, 2 Discrete Inputs, 2 Discrete Outputs, 2 Analog Inputs, 1 Thermistor Input, 1 Counter Input -PM2: Pre-mapped, 4 Discrete Inputs, 4 Discrete Outputs, 2 Analog Inputs, 2 Analog Outputs -PM8: Pre-mapped, 12 Selectable Discrete Sourcing Inputs/Outputs -PM8L: Pre-mapped, 12 Selectable Discrete Sourcing Inputs/Outputs, No LCD -PB1: Board Module, FlexPower, 2 Discrete Inputs, 2 Discrete Outputs, 2 Analog Inputs -PB2: Board Module, 2 Discrete Inputs, 2 Discrete Outputs, 2 Analog Inputs, 2 Analog Outputs

14	Housing type	C: IP20 Base E: Environmental IP67 housing with internal battery Blank: IP67 Base
15-19	Country code or Special Order Number	-FR: France -#####: Special Order Number -NB: No battery (for internal battery models)

4.2.4 Model DX80DR MultiHop Data Radio

Example model number

Digits Place	1-4	5-6	7	8	9-11	12-13
Value	DX80	DR	9	M	-H12	-KR

Digit	Description	Options
1-4	Radio model number	DX80
5-6	Device type	DR: Data Radio ER: Ethernet Data Radio SR: Serial Data Radio
7	Radio frequency	2: 2.4 GHz 9: 900 MHz
8	Communication type	M: Serial
9-11	I/O Configuration	-H: No I/O -H1: FlexPower, 4 Discrete Inputs, 2 Discrete Outputs, 4 Analog Inputs, 1 Thermistor Input, 1 Counter Input -H2: 4 Discrete Inputs, 4 Discrete Outputs, 2 Analog Inputs, 2 Analog Outputs -H3: FlexPower, Thermocouple -H4: FlexPower, RTD -H5: FlexPower, 4 Discrete Inputs, 2 Discrete Outputs, 4 Analog Inputs -H6: Serial Interface -H7: FlexPower, 12 Selectable Discrete Sinking Inputs/Outputs -H8: 12 Selectable Discrete Sourcing Inputs/Outputs -H12: FlexPower, SDI-12 Interface, H-Bridge Interface, 2 Discrete Inputs, 2 Discrete Outputs, 2 Analog Inputs, 1 Thermistor Input, 1 Counter Input -HB1: Board Module, FlexPower, 2 Discrete Inputs, 2 Discrete Outputs, 2 Analog Inputs -HB2: Board Module, 2 Discrete Inputs, 2 Discrete Outputs, 2 Analog Inputs, 2 Analog Outputs

4.2.5 Model DX85

Example model number

Digits Place	1	2	3	4	5	6	7	8	9	10	11	12	13
Value	DX85				M	4	P	4	M	2	M	2	C

Digit	Description	Options
1-4	Radio model number	DX85
5	Device type	M: Modbus slave (RS-485) C: custom
6	Discrete input quantity	0, 2, 4, 6, 8
7	Discrete type	P: Sourcing (PNP) N: Sinking (NPN)
8	Discrete output quantity	0, 2, 4, 6, 8
9	Analog input type	B: Bridge J: TC, Type J K: TC, Type K M: 0–20 mA R: RTD T: TC, Type T V: 0–10V dc X: None
10	Analog input quantity	0, 2, 4
11	Analog output type	M: 0–20 mA X: None
12	Analog output quantity	0, 2, 4
13	Housing type	Blank: IP67 Base C: IP20 Base

4.3 Battery Powered Versions

4.3.1 Internal Battery Versions

Internal battery versions are powered by a single XENO Energy Co. Ltd. XL-205F Lithium Thionyl Chloride cell which is installed in a single cell holder which is secured to the base of the enclosure.

4.3.2 External Battery Versions

External battery versions are connected via a cable and connector to a DX81 FlexPower Battery Supply which uses one user-replaceable XENO XL-205F Lithium Thionyl Chloride cell.

The DX81 FlexPower Battery Supply uses the same enclosure as the DX70/80/85 Plastic Enclosure versions except that it uses a blank cover (no display windows or push-buttons). A two layer glass-epoxy circuit board with a single cell holder is screwed to the bottom of the enclosure.

4.4 Enclosures

4.4.1 Plastic Enclosure Versions

The material for the base is Sabic polycarbonate Lexan Resin 143R. It is yellow or black in colour, has no fillers, has a UV stabilizer added, no surface treatments and a relative temperature index 130°C (which is 50°C above the maximum service temperature of 80C).

The material for the top is Sabic polycarbonate Lexan Resin 505RU. It is black in colour, is 10% glass fiber reinforced, is flame retardant, has a UV stabilizer added, no surface treatments and a relative temperature index 136°C (which is 56°C above the maximum service temperature of 80C).

The material for the LCD lens in the top is Sabic polycarbonate Lexan Resin 123. It has no colour, has no fillers, has a UV stabilizer added, no surface treatments and a relative temperature index 100°C (which is 20°C above the maximum service temperature of 80C).

4.4.2 Metallic (Limatherm) Enclosure Versions

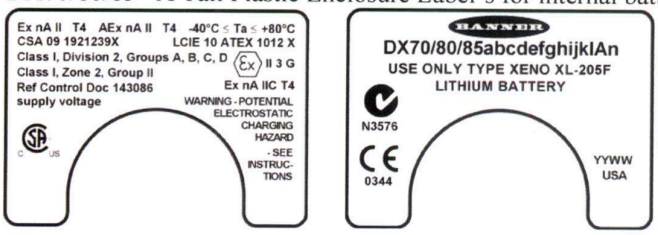
"Limatherm" Model XD-ID100win, two-compartment enclosure. CSA Certified for Class II, Division 1, Groups E, F & G, Class III under Certificate 231723-1823706, FM Approved for Class II, Division 1, Groups E, F & G, Class III under Certificate 3026118 and FTZU (ATEX) Approved for II 2 D under Certificate FTZU 04 ATEX 0332U.

4.5 Circuit Boards

All circuit boards are glass-epoxy. Refer to the Descriptive Documents for schematic diagram, component layout, trace layout, bill of materials (BOM) and dimensions.

5. Markings

DX70/80/85 –A Tall Plastic Enclosure Label's for internal battery devices.



Supply voltage will display "+3.6V to 5Vdc", "+10V to 30Vdc", or "+3.6Vdc/+10V to 30Vdc" depending on the model. 900MHz models will not display the C-Tick symbol. Only internal battery versions will display battery information.

DX70/80/85 –C (short) Plastic Enclosure Label, Flex Gateway, and Data Radio.



Supply voltage will display "+10V to 30Vdc" or "3.6Vdc/+10V to 30Vdc" depending on the model. 900MHz models will not display the C-Tick symbol.

DX80 –E (Environmental) Plastic Enclosure Label.



Supply voltage will display "3.6Vdc", "+10V to 30Vdc" or "3.6Vdc/+10V to 30Vdc" depending on the model. 900MHz models will not display the C-Tick symbol.

DX80 –E (Environmental) Plastic Enclosure Label.



DX81 Plastic Enclosure Label.



XXXX will display "LITH" or nothing depending on the model.

DX80 Metal Enclosure Label



Ink printed onto an Aluminum plate that is 35mm X 65mm and 0.5mm thick. This plate will then be screwed onto the housing using 2 blind screws represented here with the two crossed circles on either side of the plate. 900MHz models will not display the C-Tick symbol.

6. Routine Testing

None.

7. Special Condition for Safe Use (X)

The Wireless Network Controllers (plastic enclosure versions) and FlexPower Battery Supply must be installed in a suitable enclosure per Control Document 143086 meeting the requirements of EN 60079-15.

8. Documentation

All documentation is listed in Technical File No. B_083186 Rev. 5.

Vérifié et Certifié conforme à l'execution

le: May 15, 2015
Nom: Mr. Roger Eagle
Fonction: Regulatory Compliance Manager Signature:

CERTIFIÉ CONFORME
À L'EXÉCUTION
Signature Roger Eagle
Date 5/15/15

Document Number: 134430 Rev C

3/12/2015

Banner Engineering Sure Cross™
CSA C/US Class I, Division 2, Groups A, B, C, D; Class I, Zone 2, Group IIC
Class II, Division 1, Groups E, F, G
Class III, Division 1
LCIE/ATEX Group IIC, Zone 2 Dust, Zone 22

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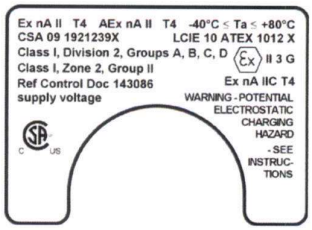
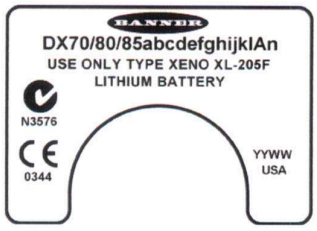
À L'EXÉCUTION
Signature Kayn Engle
Date 5/15/15

DX70/80/85 –A Plastic Enclosure Label 1



Supply voltage will display "+3.6V to 5Vdc", "+10V to 30Vdc", or "+3.6Vdc/+10V to 30Vdc" depending on the model.

DX80 –A Plastic Enclosure Label 2 for internal battery devices



900MHz models will not display the C-Tick symbol. Only internal battery versions will display battery information.

DX70/80/85 –C Plastic Enclosure Label



900MHz models will not display the C-Tick symbol. Supply voltage will display "3.6Vdc", "+10V to 30Vdc" or "3.6Vdc/+10V to 30Vdc" depending on the model.

DX80 –E Plastic Enclosure Label

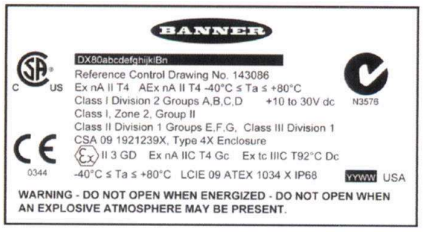




900MHz models will not display the C-Tick symbol. Supply voltage will display "3.6Vdc", "+10V to 30Vdc" or "3.6Vdc/+10V to 30Vdc" depending on the model.

See page 4, 5, 6, 7 and 9 for a description of the *abcdefghijklmn* suffix Model numbering scheme.

DX80 –B Metal Enclosure Label



Ink printed onto an Aluminum plate that is 35mm X 65mm and 0.5mm thick. This plate will then be screwed onto the housing using 2 blind screws. See page 5 for a description of the *abcdefghijklBn* suffix Model numbering scheme. 900MHZ models will not display the C-Tick symbol.

DX80 Board Module Label



Label is 2.0 inches by 0.375 inches. See page 8 for a description of the *abcdefgh* suffix model numbering scheme.

Smart Sensors Label



Label is 1.28 inches by 0.95 inches. Supply voltage field will display "+3.6V to 5.5Vdc/+12V to 24Vdc" or "+3.6V to 5.5Vdc" depending on the model. See page 10 for a description of the M12FTHxQ model numbering scheme.

Battery Supply Enclosure Label



See page 10 for a description of the *xxxx* suffix model numbering scheme.

CSA logo will be at least 0.25 inches in diameter.

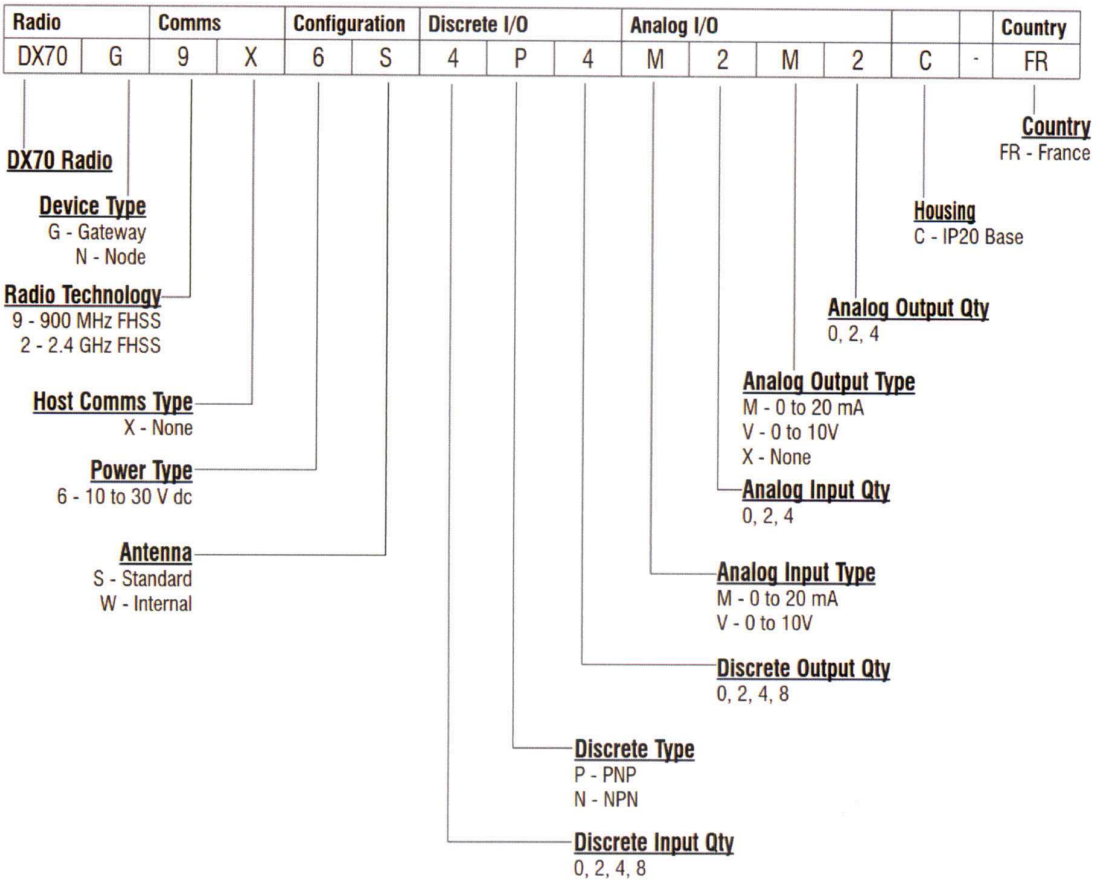
Date Code is Year Year Week Week (Plant)

Labels are approximately printed size.

DX70/80/81/85 and DX80 Board Module device labels will be made from CSA Approved label material: "Commerce Label, Inc." (LR 98462) Pressure-sensitive "L-23"** white polyester, 4 mil to 6 mil with flexographic printing and clear polyester lamination overall.

Smart Sensor device labels will be made from CSA Approved label material: "Commerce Label, Inc." (LR 98462) Pressure-sensitive "L-46"** clear polyester, 4 mil to 6 mil with flexographic printing and clear polyester lamination overall.

DX70 Model Numbering Scheme



DX80 Model Numbering Scheme

Radio		Comms		Configuration		Discrete I/O			Analog I/O						Misc
DX80	G	9	M	6	S	4	P	4	M	2	M	2	C	-	FR

DX80 Radio

Device Type
C - Custom software
G - Gateway
N - Node

Radio Technology
9 - 900 MHz FHSS
2 - 2.4 GHz FHSS

Host Comms Type
C - Custom
E-EtherNet/IP
M - Modbus RS-485
T - Modbus/TCP
X - None

Power Type
1 - *Flex*Power™, int battery
2 - *Flex*Power™, no int battery
6 - 10 to 30 V dc

Antenna
S - External
W - Internal
X - No antenna

Discrete Input Qty
0, 1, 2, 4, 6, 8

Discrete Output Qty
0, 2, 4, 6, 8

Discrete Type
A - Async counter
K - K50 EZ-LIGHT™
N - NPN
P - PNP
S - Serial interface

Analog Input Type
B - Bridge
M - 0 to 20 mA
R - RTD
T - Thermocouple
U - T30U Ultrasonic
V - 0 to 10 V dc
X - None
Z - M-GAGE™

Analog Input Qty
0, 2, 4

Analog Output Type
M - 0 to 20 mA
V - 0 to 10 V dc
X - None

Analog Output Qty
0, 2, 4

Housing
B - Metal housing
C - IP20 base
Blank - IP67 base

Misc
FR - France
NB - No battery
- SPRF

DX80 Performance 1 Watt Models

Radio		Comms						
DX80	G	9	M	6	S	-	P	C

DX80 Radio

Device Type
G - Gateway
N - Node

Radio Technology
9 - 900 MHz FHSS
2 - 2.4 GHz FHSS

Host Comms Type
L - Low cost (no LCD, no buttons)
M - Modbus
X - None

Power Type
1 - *Flex*Power™, int battery
2 - *Flex*Power™, no int battery
6 - 10 to 30 V dc

Antenna
S - External
X - No antenna

I/O Configuration
P - Serial RS485/RS232
P1 - FlexPower, 2 Discrete IN, 2 Discrete OUT, 2 Analog IN, Boost Voltage
P2 - 4 Discrete IN, 4 Discrete OUT, 2 Analog IN, 2 Analog OUT
P3 - FlexPower, Thermocouple
P4 - FlexPower, RTD
P5 - FlexPower, 2 Disc IN, 2 Disc OUT, 4 Analog IN
P6 - Serial interface
P7 - FlexPower, 12 NPN Discrete IO
P8 - 12 PNP Discrete IO
P12 - FlexPower, SDI-12, Bridge, Counter, Disc, Analog

PM2 - Pre-mapped, 4 Discrete OUT, 2 Analog IN, 2 Analog OUT
PM8 - Pre-mapped, 12 Discrete IO
PM8L - Pre-mapped, 12 Discrete IO, No LCD

PB1 - Board Module, FlexPower, 2 Discrete IN, 2 Discrete OUT, 2 Analog IN
PB2 - Board Module, 2 Discrete IN, 2 Discrete OUT, 2 Analog IN, 2 Analog OUT

Housing
Blank - IP67 housing
C - IP20 housing with external wiring
E - Environmental housing with internal battery
KR - For Korea

Note: Not all model number combinations are available.

DX80DR MultiHop Data Radio Model Numbering Scheme

MultiHop Data Radios

	Unit	Radio	Physical Layer			
DX80	DR	9	M	-	H	C

Data Radio
DR - Modbus
ER - Ethernet
SR - Serial

Radio Technology
9 - 900 MHz FHSS
2 - 2.4 GHz FHSS

Communications Type
M - Serial

MultiHop Models
H - No I/O
H1 - FlexPower, 4 Disc IN, 2 Disc OUT, 4 Analog IN, 1 thermistor IN, 1 Counter IN
H2 - 4 Disc IN, 4 Disc OUT, 2 Analog IN, 2 Analog OUT
H3 - FlexPower, Thermocouple
H4 - FlexPower, RTD
H5 - FlexPower, 4 Disc IN, 2 Disc OUT, 4 Analog IN
H6 - Serial interface
H7 - FlexPower 12 NPN Discrete I/O
H8 - 12 PNP Discrete I/O
H12 - FlexPower, SDI-12, Bridge, Counter, Disc, Analog

Housing
Blank - IP67 housing
C - IP20 housing with external wiring
E - Environmental housing with internal battery
KR - For Korea

MultiHop Data Radios Board Modules

	Unit	Radio	Physical Layer			
DX80	DR	9	M	-	HB1	

DR Data Radio

Radio Technology
9 - 900 MHz FHSS
2 - 2.4 GHz FHSS

Communications Type
M - Serial

MultiHop Board Modules
HB1 - FlexPower board module, 2 Disc IN, 2 Disc OUT, 2 Analog IN
HB2 - Board module, 2 Disc IN, 2 Disc OUT, 2 Analog IN, 2 Analog OUT

DX85 Model Numbering Scheme

Radio		Discrete I/O			Analog I/O				
DX85	M	4	P	4	M	2	M	2	C

DX85 Extended I/O

Device Type
M - Modbus slave (RS-485)
C - Custom software

Discrete Input Qty
0, 2, 4, 6, 8

Discrete Type
P - PNP
N - NPN

Discrete Output Qty
0, 2, 4, 6, 8

Analog Input Type
B - Bridge
J - TC, type j
K - TC, type k
M - 0 to 20 mA
R - RTD
T - TC, type T
V - 0 to 10V dc
X - None

Analog Input Qty
0, 2, 4

Analog Output Type
M - 0 to 20 mA
X - None

Analog Output Qty
0, 2, 4

Housing
C - IP20 base

DX85 Extended I/O Models

Radio			I/O Configuration	Housing
DX85	M	-	P7	C

DX85 Extended I/O

Device Type
M - Modbus slave (RS-485)
C - Custom software

Housing
Blank - IP67 base
C - IP20 base

I/O Configuration
P2 - 10 to 30 V dc, 4 DIsc IN, 4 Disc OUT, 2 Analog IN, 2 Analog OUT
P7 - FlexPower, 12 NPN Discrete I/O
P8 - 12 PNP Discrete I/O

DX81 Battery Supply Modules

Device		
DX81	-	LITH

DX81

Device Type
blank -
LITH - Lithium batteries

Smart Sensors

Models	Description
M12FTH3Q	FlexPower Temperature and Relative Humidity Sensor, Modbus Slave
M12FTH4Q	FlexPower Temperature and Relative Humidity Sensor, 1-Wire Serial

	Function	#	Model Number	Doc Number	Revision	Number of Sheets
Documents	Docs	C1	LCIE Techinical File	B_083186	2	5
		C2	LCIE Descriptive Notice	B_083190	2	9
		C3	Label Drawing	134430_D2Z2 B	B	6
		C4	DX8x Control Drawing	143086A	A	28
		C5	Document Map	134429	C	6
		C6	Document List	B_083034_3	3	2
		C7	Exploded Mechanical View	134431	A	8
		C8	Enclosure Dimensions	134432	A	8
		C9	Limatherm Technical Document	B_083034	1	9
		C10	Connector Gluing	134433	A	4
Radios	900MHz Radio	D1	Raw PCB	122977	A	8
		D2	Schematic	127269	A	2
		D3	Assembly	122978	B	1
		D4	BOM	122978BOM	B	3
		D5	Dimension Drawing	127738	A	1
	2.4GHz Radio	D6	Raw PCB	128446	A	8
		D7	Schematic	129790	-	2
		D8	Assembly	128953	B	1
		D9	BOM	128953BOM	B	3
		*	Dimension Drawing	127738	*	0
	1Watt Radio	D10	Raw PCB	127827	C	8
		D11	Schematic	135496B	B	2
		D12	Assembly	127767BOM	B	1
		D13	BOM	127767B BOM	B	3
		D14	Dimension Drawing	137867	-	1
Mixed io	Main Board	D15	Raw PCB	126989	B	11
		D16	Schematic	128652J	J	6
		D17	Standard Assembly	126989ASSY	B	2
		D18	BOM	126989BOM_C	C	12
		D19	Dimension Drawing	125760	-	1
	Wiring Board A, B	D20	Raw PCB	132145	-	6
		D21	Schematic	132147	B	1
		D22	Assembly Lever	132146	A	1
		D23	Assembly Screw	133852_	-	1
		D24	BOM	133852BOM_	-	1
		D25	Dimension Drawing	133510	-	1
	Wiring Board C	D26	Raw PCB	139367	A	6
		D27	Schematic	139369	-	1
		D28	Assembly	143727A	A	1
		D29	BOM	143727ABOM	A	1
		D30	Dimension Drawing	134266	-	1
Analog io	Main Board	D31	Raw PCB	131558	B	11
		D32	Schematic	137669E	E	6
		D33	Assembly	131558ASSY	B	2
		D34	BOM	131558BOM C	C	14
		*	Dimension Drawing	125760	*	0
	Wiring Board A, B	D35	Raw PCB	133420	-	6
		D36	Schematic	133422	A	1
		D37	Assembly Lever	133421	R1	1
		D38	Assembly Screw	133981_	-	1
		D39	BOM	133981_BOM	-	1
		*	Dimension Drawing	133510	*	0
	Wiring Board C	D40	Raw PCB	139379	A	6
		D41	Schematic	139381	A	1
		D42	Assembly	143731A	A	1
		D43	BOM	143731A BOM	A	1
		*	Dimension Drawing	134266	*-	0
	Main Board	D44	Raw PCB	130122	C	11
		D45	Schematic	131689G	G	10
		D46	Assembly	130122ASSY	C	2
		D47	BOM	130122BOM D	D	14
		*	Dimension Drawing	125760	*	0
	6600 Wiring Board A, B	D48	Raw PCB	132134	-	6
		D49	Schematic	132138	B	1
		D50	Assembly Lever	133853	R1	1
		D51	Assembly Screw	132135	B	1
		D52	BOM	132134BOM	-	1
		*	Dimension Drawing	133510	*	0
	6600 Wiring Board C	D53	Raw PCB	139376	A	6
		D54	Schematic	139378	B	1
		D55	Assembly	143730 A	A	1
		D56	BOM	143730ABOM	A	1
		*	Dimension Drawing	134266	*-	0
	8400 Wiring Board A, B	D57	Raw PCB	132139	-	6

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À L'EXÉCUTION
Signature D. Hagen
Date 2/15/11

	Function	#	Model Number	Doc Number	Revision	Number of Sheets
Digital io		D58	Schematic	132141	A	1
		D59	Assembly Lever	132140	R1	1
		D60	Assembly Screw	133850_	-	1
		D61	BOM	133850_BOM	-	1
		*	Dimension Drawing	133510	*	0
	8400 Wiring Board C	D62	Raw PCB	139370	A	6
		D63	Schematic	139372	B	1
		D64	Assembly	143728A	A	1
		D65	BOM	143728ABOM	A	1
		*	Dimension Drawing	134266	*-	0
	4800 Wiring Board A, B	D66	Raw PCB	132142	-	6
		D67	Schematic	132144	A	1
		D68	Assembly Lever	132143	R1	1
		D69	Assembly Screw	133851	-	1
		D70	BOM	133851_BOM	-	1
		*	Dimension Drawing	133510	*	0
	4800 Wiring Board C	D71	Raw PCB	139373	A	6
		D72	Schematic	139375	B	1
		D73	Assembly	143729A	A	1
		D74	BOM	143729ABOM	A	1
		*	Dimension Drawing	134266	*-	0
Flex Gateway and Data Radio	Main Board	D75	Raw PCB	129333D	D	11
		D76	Schematic	135497G	G	4
		D77	Assembly 900MHz	137165F	F	2
		D78	Assembly 2.4GHz	140809C	C	2
		D79	BOM 900MHz	137165F BOM	F	7
		D80	BOM 2.4GHz	140809C BOM	C	7
		*	Dimension Drawing	125760	*	0
Mini DIN Wiring Board	Wiring Board	D81	Raw PCB	130587	-	5
		D82	Schematic	130711	-	1
		D83	Assembly	130588	-	1
		D84	BOM	150588BOM	-	1
		D85	Dimension Drawing	130710	-	1
Flex Boost Nodes	Main Board	D86	Raw PCB	127647	C	11
		D87	Schematic	129223J	J	5
		D88	Assembly	127647ASSY	C	2
		D89	BOM	127647BOM D	D	10
		*	Dimension Drawing	125760	*	0
	Wiring Board	D90	Raw PCB	142974	A	6
		D91	Schematic	142976	A	1
		D92	Assembly	142975 A	A	1
		D93	BOM	142975 A BOM	A	1
		D94	Dimension Drawing	134266	A	1
Flex 4400 Nodes	Main Board	D95	Raw PCB	135289	B	9
		D96	Schematic	135291D	D	6
		D97	Assembly	135289ASSY	B	2
		D98	BOM	135289BOM C	C	10
		*	Dimension Drawing	125760	*	0
	Wiring Board	D99	Raw PCB	142977	A	6
		D100	Schematic	142979	A	1
		D101	Assembly	142978A	A	1
		D102	BOM	142978A BOM	A	1
		*	Dimension Drawing	134266	*A	0
Flex Instrumentation Nodes	Main Board	D103	Raw PCB	128565	B	11
		D104	Schematic	129224G	G	8
		D105	Assembly	128565ASSY	B	2
		D106	BOM	128565BOM C	C	12
		*	Dimension Drawing	125760	*	0
	Wiring Board	D107	Raw PCB	142980	A	6
		D108	Schematic	142982	A	1
		D109	Assembly	142981A	A	1
		D110	BOM	142981A BOM	A	1
		*	Dimension Drawing	134266	*A	0
MGAGE Standard Nodes	Main Board	D111	Raw PCB	127993	D	9
		D112	Schematic	131605C	C	6
		D113	900MHz Assembly	131362	D	2
		D114	900MHz BOM	131362BOM	D	6
		D115	2.4GHz Assembly	131604	R1	2
		D116	2.4GHz BOM	131604BOM	R1	6
		*	Dimension Drawing	125760	*	0
Battery Supply	Single Cell Board	D117	Raw PCB	126234	-	6
		D118	Schematic	130024	-	1
		D119	Assembly	126235	-	1
		D120	BOM	126235BOM	-	1
		D121	Dimension Drawing	130023	-	1
					Total Pages	527

* denotes that the document is listed earlier