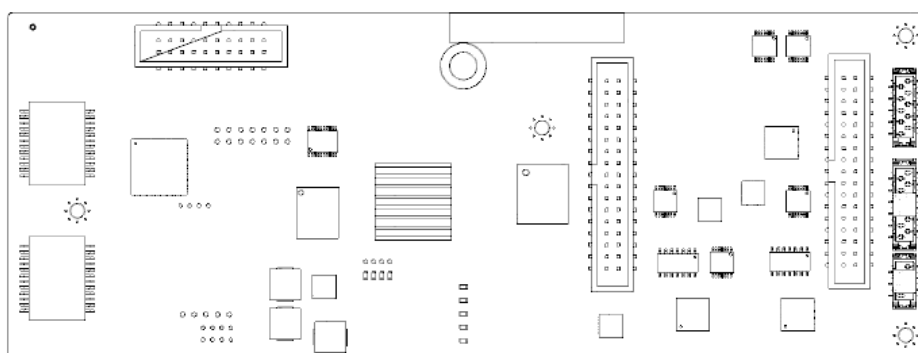




# LOTO



# USER GUIDE

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online version available on [www.powersoft-audio.com](http://www.powersoft-audio.com).

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# Important safety instructions



THE TRIANGLE WITH THE LIGHTNING BOLT IS USED TO ALERT THE USER TO THE RISK OF ELECTRIC SHOCK.



THE TRIANGLE WITH THE EXCLAMATION POINT IS USED TO ALERT THE USER TO IMPORTANT OPERATING OR MAINTENANCE INSTRUCTIONS.



THE CE-MARK INDICATES THE COMPLIANCE OF THE PRODUCT TO ALL THE APPLICABLE EUROPEAN DIRECTIVES



SYMBOL FOR EARTH/GROUND CONNECTION.



SYMBOL INDICATING THAT THE EQUIPMENT IS FOR INDOOR USE ONLY.



SYMBOL FOR CONFORMITY WITH DIRECTIVE 2012/19/EC OF THE EUROPEAN PARLIAMENT ON WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE).



DO NOT USE THE UNIT AT ALTITUDES ABOVE 2000 M.



DO NOT USE THE UNIT IN TROPICAL ENVIRONMENT.



WARNING: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT ATTEMPT TO OPEN ANY PART OF THE UNIT. NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.



CONNECTION TO THE MAINS AND TO THE AUDIO OUTPUT SHALL BE DONE ONLY BY A ELECTROTECHNICAL SKILLED PERSON ACCORDING THE NATIONAL REQUIREMENTS OF THE COUNTRIES WHERE THE UNIT IS SOLD.



DO NOT USE THIS AMPLIFIER IF THE ELECTRICAL POWER CORD IS FRAYED OR BROKEN.



TO AVOID ELECTRICAL SHOCK, DO NOT TOUCH ANY EXPOSED SPEAKER WIRING WHILE THE AMPLIFIER IS OPERATING.



DO NOT SPILL WATER OR OTHER LIQUIDS INTO OR ON THE AMPLIFIER.



NO NAKED FLAME SOURCES SUCH AS LIGHTED CANDLES SHOULD BE PLACED ON THE AMPLIFIER.



WARNING TO PREVENT INJURY, THIS APPARATUS MUST BE SECURELY ATTACHED TO THE FLOOR/WALL IN ACCORDANCE WITH THE INSTALLATION INSTRUCTIONS.



THIS DEVICE MUST BE POWERED EXCLUSIVELY BY EARTH CONNECTED MAINS SOCKETS IN ELECTRICAL NETWORKS COMPLIANT TO THE IEC 364 OR SIMILAR RULES



DISCONNECT THE AC MAINS SOURCE BEFORE ATTEMPTING TO CLEAN ANY PART OF THE AMPLIFIER



POWERSOFT SUGGESTS TO PLUG THE LOTO DSP TO A 16 A RATING, C OR D CURVE, 10 KA SECTIONING BREAKER.



IT IS HIGHLY RECOMMENDED TO UNPLUG THE OUTPUT CONNECTORS BEFORE PROCEEDING WITH THE SELF CHECK PROCEDURE



THE TESTING SIGNALS MIGHT CAUSE LOUDSPEAKER IMPAIRMENTS.



**CLASS 3 WIRING**

OUTPUT TERMINALS ARE HAZARDOUS: WIRING CONNECTION TO THESE TERMINALS REQUIRES INSTALLATION BY AN INSTRUCTED PERSON AND THE USE OF READY MADE LEADS.



PROPERLY FIT THE AC MAINS PLUG TO THE AMPLIFIER INLET. BEFORE POWERING THIS AMPLIFIER, VERIFY THAT THE CORRECT VOLTAGE RATING IS BEING USED.



VERIFY THAT YOUR MAINS CONNECTION IS CAPABLE OF SATISFYING THE POWER RATINGS OF THE DEVICE.



TAKE CARE TO LOCK THE OUTPUT TERMINAL BEFORE SWITCHING THE DEVICE ON.




**CAUTION**

**RISK OF ELECTRIC SHOCK DO NOT OPEN**



This unit has been engineered and manufactured to ensure your personal safety. But IMPROPER USE CAN RESULT IN POTENTIAL ELECTRICAL SHOCK OR FIRE HAZARD.

In order not to defeat the safeguards incorporated into this product, observe the following basic rules for its installation, use and service. Please read these "Important Safeguards" carefully before use.

- Read these instructions.
- Keep these instructions.
- Heed all warnings.
- Follow all instructions.
- Do not use this equipment near water.
- Clean only with a dry cloth.
- Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus that produce heat.
- Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
- Only use attachments/accessories specified by the manufacturer.
- Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over. 
- Unplug this apparatus during lightning storms or when unused for long periods of time.
- Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
- The apparatus shall be connected to a MAINS socket outlet with a protective earthing connection
- Where the MAINS plug or an appropriate coupler is used as the disconnect device, the disconnect device shall remain readily operable.

**THE MANUFACTURER CANNOT BE HELD RESPONSIBLE FOR DAMAGES CAUSED TO PERSONS, THINGS OR DATA DUE TO AN IMPROPER OR MISSING GROUND CONNECTION.**

**CONTACT THE AUTHORIZED SERVICE CENTER FOR ORDINARY AND EXTRAORDINARY MAINTENANCE.**

**IT IS ABSOLUTELY NECESSARY TO VERIFY THESE FUNDAMENTAL REQUIREMENTS OF SAFETY AND, IN CASE OF DOUBT, REQUIRE AN ACCURATE CHECK BY QUALIFIED PERSONNEL.**

# Importantes instructions de sécurité



LE TRIANGLE AVEC LE SYMBOLE D'UN ÉCLAIR EST UTILISÉ POUR ALERTER L'UTILISATEUR DU RISQUE DE CHOC ÉLECTRIQUE.



LE TRIANGLE AVEC LE POINT D'EXCLAMATION EST UTILISÉ POUR ALERTER L'UTILISATEUR SUR DES INSTRUCTIONS DE FONCTIONNEMENT OU D'ENTRETIEN IMPORTANTES.



LA MARQUE CE INDIQUE LA CONFORMITÉ DU PRODUIT À TOUTES LES DIRECTIVES EUROPÉENNES EN VIGUEUR



SYMBOLE POUR LA CONNEXION TERRE / MASSE.



SYMBOLE INDIQUANT QUE L'ÉQUIPEMENT EST DESTINÉ À UN USAGE INTÉRIEUR UNIQUEMENT.



SYMBOLE DE CONFORMITÉ AVEC LA DIRECTIVE 2012/19/CE DU PARLEMENT EUROPÉEN RELATIVE AUX DÉCHETS D'ÉQUIPEMENTS ÉLECTRIQUES ET ÉLECTRONIQUES (DEEE).



NE PAS UTILISER PAS L'APPAREIL À DES ALTITUDES AU-DESSUS DE 2 000 M.



NE PAS UTILISER L'APPAREIL DANS UN ENVIRONNEMENT TROPICAL.



AVERTISSEMENT : POUR RÉDUIRE LE RISQUE DE CHOC ÉLECTRIQUE, NE PAS ESSAYER D'OUVRIER TOUTE PARTIE DE L'APPAREIL. AUCUNE PIÈCE RÉPARABLE PAR L'UTILISATEUR À L'INTÉRIEUR. RENVOYER L'ENTRETIEN AU PERSONNEL DE SERVICE QUALIFIÉ.



LE BRANCHEMENT AU SECTEUR ET AUX AUDIO SORTIE NE SERA EFFECTUE QUE PAR UNE PERSONNE QUALIFIÉE DANS LE DOMAINE ÉLECTRO-TECHNIQUE SELON LES EXIGENCES NATIONALES DES PAYS OU L'APPAREIL EST VENDU.



NE PAS UTILISER CET AMPLIFICATEUR SI LE CORDON D'ALIMENTATION ÉLECTRIQUE EST EFFILOCHÉ OU BRISÉ.



POUR ÉVITER LES CHOC ÉLECTRIQUES, NE TOUCHER AUCUN CÂBLAGE D'ENCEINTE EXPOSÉ LORSQUE L'AMPLIFICATEUR FONCTIONNE.



NE PAS RENSERVER D'EAU OU D'AUTRES LIQUIDES DANS OU SUR L'AMPLIFICATEUR.



AUCUNE SOURCE DE FLAMME NUE COMME DES BOUGIES ALLUMÉES NE DOIT ÊTRE PLACÉE SUR L'AMPLIFICATEUR.



AVERTISSEMENT POUR PRÉVENIR LES BLESSURES, CET APPAREIL DOIT ÊTRE SOLIDEMENT FIXÉ AU SOL / MUR EN CONFORMITÉ AVEC LES INSTRUCTIONS D'INSTALLATION.



CET APPAREIL DOIT ÊTRE ALIMENTÉ EXCLUSIVEMENT PAR RACCORDES DE SECTEUR CONNECTÉS À LA TERRE DANS DES RÉSEAUX ÉLECTRIQUES CONFORMES AUX NORMES CEI 364 OU AUX RÈGLES SIMILAIRES



DÉCONNECTER LA SOURCE SECTEUR AVANT DE TENTER TOUT NETTOYAGE DE L'AMPLIFICATEUR



POWERSOFT RECOMMANDE DE BRANCHER LA SÉRIE T À UNE VALEUR DE 16 A, UNE COURBE C OR D, UN DISJONCTEUR SECTIONNEUR DE 10 KA.



IL EST FORTEMENT RECOMMANDÉ DE DÉBRANCHER LES CONNECTEURS DE SORTIE AVANT DE PROCÉDER À LA PROCÉDURE D'AUTO-VÉRIFICATION



LES SIGNAUX D'ESSAI PEUVENT CAUSER DES DÉFAILLANCES AUX HAUT-PARLEURS.



**CLASS3  
WIRING**

LES TERMINAUX DE SORTIE SONT DANGEREUX : LA CONNEXION DU CÂBLAGE À CES BORNES REQUIERT L'INSTALLATION PAR UNE PERSONNE FORMÉE ET L'UTILISATION DE FILS PRÊTS À L'EMPLOI.



BRANCHER CORRECTEMENT LA FICHE SECTEUR CA À L'ENTRÉE DE L'AMPLIFICATEUR.



AVANT D'ALIMENTER CET AMPLIFICATEUR, VÉRIFIER QUE LA TENSION UTILISÉE EST CORRECTE.



VÉRIFIER QUE VOTRE CONNEXION SECTEUR EST CAPABLE DE SATISFAIRE LES VALEURS DE PUISSANCE DE L'APPAREIL.



VEILLER À VERROUILLER LA BORNE DE SORTIE AVANT D'ALLUMER L'APPAREIL.



**ATTENTION**

**RISQUE DE CHOC  
ÉLECTRIQUE NE PAS OUVRIR**



Cet appareil a été conçu et fabriqué pour assurer votre sécurité personnelle. Mais UNE UTILISATION INCORRECTE PEUT ENTRAÎNER UN RISQUE D'ÉLECTROCUTION OU D'INCENDIE.

Respecter les règles de base suivantes pour son installation, utilisation et entretien, afin de ne pas compromettre les mesures de sécurité incorporées dans ce produit. Veuillez lire attentivement ces « Consignes de sécurité importantes » avant utilisation.

- Lire ces instructions.
- Conserver ces instructions.
- Tenir compte de tous les avertissements.
- Suivre toutes les instructions.
- Ne pas utiliser cet équipement près de l'eau.
- Nettoyer uniquement à l'aide d'un chiffon sec.
- Ne bloquer aucune bouche d'aération. Installer conformément aux instructions du fabricant.
- Ne pas installer à proximité de sources de chaleur telles que radiateurs, bouches de chaleur, poêles ou autres appareils produisant de la chaleur.
- Ne pas déjouer l'objectif de sécurité de la fiche polarisée ou mise à la terre. Une fiche polarisée possède deux lames dont l'une est plus large que l'autre. Une prise de terre a deux lames et une troisième broche de mise à la terre. La lame large ou la troisième broche sont fournies pour votre sécurité. Si la fiche fournie ne rentre pas dans votre prise, consulter un électricien pour le remplacement de la prise obsolète.
- Protéger le cordon d'alimentation contre tout piétinement ou pincement, en particulier au niveau des fiches, des prises de courant et du point de sortie de l'appareil.
- Utiliser uniquement les fixations/accessoires spécifiés par le fabricant.
- Utiliser uniquement avec le chariot, le support, le trépied, l'étrier ou la table spécifiée par le fabricant ou vendus avec l'appareil. Lorsqu'un chariot est utilisé, faire attention pendant le déplacement du bloc chariot/appareil pour éviter les blessures causées par un renversement.
- Débrancher cet appareil pendant les orages ou lorsqu'il n'est pas utilisé pendant de longues périodes.
- Confier toute réparation à un technicien qualifié. Un entretien est requis lorsque l'appareil a été endommagé de quelque façon que ce soit, par exemple un cordon d'alimentation ou une prise endommagée, du liquide qui a été renversé ou des objets qui sont tombés dans l'appareil, si l'appareil a été exposé à la pluie ou à l'humidité ou s'il est tombé.
- L'appareil doit être connecté à une prise SECTEUR dotée d'une mise à la terre de protection
- Lorsque la prise SECTEUR ou un coupleur approprié est utilisé comme dispositif de déconnexion, le dispositif de déconnexion doit rester facilement accessible.



**LE FABRICANT NE PEUT ÊTRE TENU RESPONSABLE DES DOMMAGES CAUSÉS AUX PERSONNES, AUX CHOSSES OU AUX DONNÉES EN RAISON D'UNE CONNEXION À LA TERRE INCORRECTE OU MANQUANTE.**

**CONTACTER LE CENTRE DE SERVICE AUTORISÉ POUR UN ENTRETIEN ORDINAIRE ET EXTRAORDINAIRE.**

**IL EST ABSOLUMENT NÉCESSAIRE DE VÉRIFIER CES CONDITIONS FONDAMENTALES DE SÉCURITÉ ET, EN CAS DE DOUTE, D'OBTENIR UNE VÉRIFICATION PRÉCISE PAR DU PERSONNEL QUALIFIÉ.**

# Instrucciones de seguridad importantes



EL TRIÁNGULO CON EL RAYO ES USADO PARA ALERTAR AL USUARIO DEL RIESGO DE DESCARGA ELÉCTRICA.



EL TRIÁNGULO CON EL SIGNO DE EXCLAMACIÓN ES USADO PARA ALERTAR AL USUARIO DE INSTRUCCIONES DE OPERACIÓN Y MANTENIMIENTO IMPORTANTES.



LA MARCA CE INDICA LA CONFORMIDAD DEL PRODUCTO CON TODAS LAS DIRECTIVAS EUROPEAS APLICABLES



SÍMBOLO PARA TIERRA/CONEXIÓN A TIERRA.



SÍMBOLO INDICANDO QUE EL EQUIPO ES SOLO PARA USO INTERIOR.



SÍMBOLO PARA LA CONFORMIDAD CON LA DIRECTIVA 2012/19/EC DEL PARLAMENTO EUROPEO SOBRE EL DESECHO DE EQUIPOS ELÉCTRICOS Y ELECTRÓNICOS (WEEE por sus siglas en Inglés).



NO USE LA UNIDAD EN ALTITUDES SOBRE LOS 2000 METROS.



NO USE LA UNIDAD EN AMBIENTES TROPICALES.



ADVERTENCIA: PARA REDUCIR EL RIESGO DE DESCARGA ELÉCTRICA, NO INTENTE ABRIR NINGUNA PARTE DE LA UNIDAD. NO EXISTEN PARTES INTERNAS REPARABLES PARA EL USUARIO. REFIERA LA REVISIÓN A PERSONAL DE MANTENIMIENTO CALIFICADO.



LA CONEXIÓN A LA RED ELÉCTRICA Y A LAS AUDIO SALIDA DEBERÁ SER EFECTUADA SOLAMENTE POR UNA PERSONA QUE ESTÉ CAPACITADA EN EL ÁREA DE ELECTROTÉCNICA DE ACUERDO A LOS REQUERIMIENTOS NACIONALES DE LOS PAÍSES DONDE LA UNIDAD SEA VENDIDA.



NO USE ESTE AMPLIFICADOR SI EL CABLE DE LA ENERGÍA ELÉCTRICA ESTÁ RASGADO O CORTADO.



CON EL FIN DE EVITAR DESCARGAS ELÉCTRICAS, NO TOQUE NINGÚN CABLEADO DEL ALTOPARLANTE QUE SE ENCUENTRE AL DESCUBIERTO MIENTRAS EL AMPLIFICADOR ESTÉ FUNCIONANDO.



NO DERRAME AGUA U OTROS LÍQUIDOS DENTRO O SOBRE EL AMPLIFICADOR.



NO DEBEN COLOCARSE FUENTES DE LLAMAS DESCUBIERTAS TALES COMO VELAS ENCENDIDAS SOBRE EL AMPLIFICADOR.



ADVERTENCIA: PARA EVITAR DAÑOS, ESTE APARATO DEBE ESTAR ADHERIDO DE FORMA SEGURA AL SUELO/PARED CONFORME A LAS INSTRUCCIONES PARA SU INSTALACIÓN.



ESTE DISPOSITIVO DEBE SER ENCENDIDO EXCLUSIVAMENTE DESDE LOS TOMACORRIENTES DE LA RED ELÉCTRICA CONECTADOS A TIERRA EN REDES ELÉCTRICAS QUE CUMPLEN CON LAS REGLAS IEC 364 O AFINES



DESCONECTE LA FUENTE DE LA RED ELÉCTRICA AC ANTES DE INTENTAR LIMPIAR CUALQUIER PARTE DEL AMPLIFICADOR



POWERSOFT SUGIERE CONECTAR LA SERIE T A UNA CURVA C O D DE 16 A O A UN INTERRUPTOR DE SECCIONAMIENTO 10 KA.



SE RECOMIENDA ALTAMENTE DESENCHUFAR LOS CONECTORES DE SALIDA ANTES DE CONTINUAR CON EL PROCEDIMIENTO DE AUTO CHEQUEO



LAS SEÑALES DE PRUEBA PODRÍAN CAUSAR DETERIOROS EN EL ALTAVOZ.



**CLASS3 WIRING**

LOS TERMINALES DE SALIDA SON PELIGROSOS: LA CONEXIÓN DE CABLES A ESTOS TERMINALES REQUIERE DE INSTALACIÓN EFECTUADA POR UNA PERSONA CON LA FORMACIÓN ADECUADA Y EL USO DE CABLES YA ENSAMBLADOS.



INSTALE APROPIADAMENTE LOS ENCHUFES DE LA RED ELÉCTRICA AC EN LA ENTRADA DEL AMPLIFICADOR.



ANTES DE ENCENDER ESTE AMPLIFICADOR, VERIFIQUE QUE ESTÉ SIENDO USADO EL ÍNDICE DE VOLTAJE CORRECTO.



VERIFIQUE QUE SU CONEXIÓN A LA RED ELÉCTRICA ES CAPAZ DE SATISFACER LOS ÍNDICES DE ENERGÍA DE ESTE DISPOSITIVO.



ASEGÚRESE DE CERRAR EL TERMINAL DE SALIDA ANTES DE ENCENDER EL DISPOSITIVO.



**PRECAUCIÓN**  
**RIESGO DE DESCARGA ELÉCTRICA**  
**NO ABRA**



Esta unidad ha sido diseñada y fabricada para garantizar su seguridad personal. Pero SU USO INADECUADO PUEDE RESULTAR EN UNA POTENCIAL DESCARGA ELÉCTRICA O RIESGO DE FUEGO.

Con el fin de no anular las garantías incorporadas en este producto, siga las siguientes reglas básicas para su instalación, uso y servicio. Por favor lea cuidadosamente estas "Garantías Importantes" antes de su uso.

- Lea estas instrucciones.
- Mantenga estas instrucciones.
- Tenga en cuenta todas las advertencias.
- Siga todas las instrucciones.
- No use este equipo cerca del agua.
- Limpie solamente con un paño seco.
- No bloquee las aberturas de ventilación. Instale en conformidad con las instrucciones del fabricante.
- No instale cerca de ninguna fuente de calor tales como radiadores, registradores de calor, cocinas u otros aparatos que produzcan calor.
- No anule el propósito de seguridad del enchufe polarizado o con conexión a tierra. Un enchufe polarizado tiene dos clavijas, una más ancha que la otra. Un enchufe con conexión a tierra tiene dos clavijas y un tercer diente para su conexión a tierra. La clavija ancha o el tercer diente se proporcionan para su seguridad. Si el enchufe proporcionado no encaja en su tomacorriente, consulte a un electricista para que reemplace el que ya no sirve.
- Proteja el cable de electricidad para que no sea pisoteado o pinchado particularmente en los enchufes, los receptáculos de conveniencia y el punto donde estos salen del aparato.
- Use solo complementos/accesorios especificados por el fabricante.
- Use solo con el carrito, estante, trípode, anaquel o mesa especificados por el fabricante o vendidos con el aparato. Cuando se usa un carrito, tenga cuidado al mover la combinación de carrito/aparato y así evitar daños en caso de que se caiga.
- Desenchufe este aparato durante una tormenta eléctrica o cuando no se use por largos períodos de tiempo.
- Refiera todo el mantenimiento a personal calificado. Se requiere de servicio cuando el aparato ha sido dañado en cualquier forma, tales como enchufes o cables de suministro de energía eléctrica dañados, que se haya derramado líquido u objetos hayan caído dentro del aparato, que el aparato haya sido expuesto a la lluvia o humedad, que no funcione normalmente o que este se haya caído.
- Este aparato deberá ser conectado a un enchufe de salida de red eléctrica con una protectora conexión a tierra
- En el lugar donde sea usado un enchufe de salida de red eléctrica o un acoplador apropiado como el dispositivo de desconexión, este deberá poder accionarse fácilmente.




**EL FABRICANTE NO SE HACE RESPONSABLE POR DAÑOS CAUSADOS A PERSONAS, OBJETOS O DATOS DEBIDO A UNA CONEXIÓN A TIERRA INAPROPIADA O FALTANTE.**

**CONTACTE AL CENTRO DE SERVICIO AUTORIZADO PARA MANTENIMIENTO DE RUTINA O EXTRAORDINARIO.**

**ES ABSOLUTAMENTE NECESARIO VERIFICAR ESTOS REQUERIMIENTOS FUNDAMENTALES DE SEGURIDAD Y, EN CASO DE DUDA, EXIJA UN CORRECTO CHEQUEO POR PARTE DE UN PERSONAL CALIFICADO.**



# Importanti istruzioni di sicurezza

-  IL TRIANGOLO CON IL SIMBOLO DEL FULMINE VIENE UTILIZZATO PER AVVISARE L'UTENTE SUL RISCHIO DI SCOSSE ELETTRICHE.
-  IL TRIANGOLO CON IL PUNTO ESCLAMATIVO VIENE UTILIZZATO PER AVVISARE L'UTENTE SU IMPORTANTI ISTRUZIONI DI FUNZIONAMENTO O DI MANUTENZIONE.
-  IL MARCHIO CE INDICA CHE IL PRODOTTO È CONFORME A TUTTE LE DIRETTIVE EUROPEE APPLICABILI
-  SIMBOLO PER IL COLLEGAMENTO DELLA MESSA A TERRA.
-  SIMBOLO CHE INDICA CHE IL DISPOSITIVO PUO' ESSERE UTILIZZATO SOLO ALL'INTERNO.
-  SIMBOLO INDICANTE LA CONFORMITÀ ALLA DIRETTIVA 2012/19/CE DEL PARLAMENTO EUROPEO SUI RIFIUTI DI APPARECCHIATURE ELETTRICHE ED ELETTRONICHE (RAEE).
-  NON UTILIZZARE IL DISPOSITIVO AD ALTITUDINI SUPERIORI A 2000 M.
-  NON UTILIZZARE IL DISPOSITIVO IN UN AMBIENTE TROPICALE.
-  ATTENZIONE: PER RIDURRE IL RISCHIO DI SCOSSE ELETTRICHE NON TENTARE DI APRIRE ALCUNA PARTE DEL DISPOSITIVO. ALL'INTERNO NON E' PRESENTE ALCUN COMPONENTE RIPARABILE DALL'UTENTE. PER L'ASSISTENZA RIVOLGERSI A PERSONALE TECNICO QUALIFICATO.
-  IL COLLEGAMENTO ALLA RETE ELETTRICA E ALLE USCITE AUDIO DEVE ESSERE ESEGUITO DA UN ELETTROTECNICO QUALIFICATO ATTENENDOSI AI REQUISITI DEL PAESE IN CUI IL DISPOSITIVO VIENE VENDUTO.
-  NON UTILIZZARE L'AMPLIFICATORE SE IL CAVO DELL'ALIMENTAZIONE ELETTRICA E' SFILACCIATO O ROTTO.
-  PER EVITARE SCOSSE ELETTRICHE, NON TOCCARE IL CABLAGGIO DELLE CASSE ESTERNE QUANDO L'AMPLIFICATORE E' IN FUNZIONE.
-  NON VERSARE ACQUA NE' ALTRI LIQUIDI ALL'INTERNO O SOPRA L'AMPLIFICATORE.
-  NON SI DEVONO POSIZIONARE FIAMME LIBERE QUALI CANDELE ACCESE SULL'AMPLIFICATORE.
-  ATTENZIONE PER EVITARE LESIONI IL DISPOSITIVO DEVE ESSERE FISSATO IN MODO SICURO AL PAVIMENTO/ALLA PARETE ATTENENDOSI ALLE ISTRUZIONI DI INSTALLAZIONE.
-  IL DISPOSITIVO DEVE ESSERE ALIMENTATO ESCLUSIVAMENTE DA PRESE ELETTRICHE CON COLLEGAMENTO A TERRA SU RETI ELETTRICHE CONFORMI ALLO IEC 364 O A NORME SIMILI
-  SCOLLEGARE L'ALIMENTAZIONE CA PRIMA DI PULIRE QUALSIASI PARTE DELL'AMPLIFICATORE
-  POWERSOFT CONSIGLIA DI COLLEGARE LA SERIE T A UN INTERRUTTORE DI SEZIONAMENTO DA 16 A, CURVE C O D, 10 KA.
-  SI CONSIGLIA VIVAMENTE DI SCOLLEGARE I CONNETTORI DI USCITA PRIMA DI PROCEDER CON LA PROCEDURA DI AUTOCONTROLLO
-  I SEGNALE DEL TEST POTREBBERO PROVOCARE DANNI AGLI ALTOPARLANTI.
-  I MORSETTI DI USCITA SONO PERICOLOSI: IL COLLEGAMENTO DEI CAVI A QUESTI MORSETTI DEVE ESSERE ESEGUITO DA UNA PERSONA QUALIFICATA UTILIZZANDO CAVI PREPARATI.
-  **CLASS3 WIRING** COLLEGARE LA PRESA DELL'ALIMENTAZIONE CA ALL'ENTRATA DELL'AMPLIFICATORE IN MODO CORRETTO. PRIMA DI ALIMENTARE L'AMPLIFICATORE CONTROLLARE CHE SI SIA UTILIZZANDO LA TENSIONE NOMINALE CORRETTA.
-  CONTROLLARE CHE LA CONNESSIONE DI RETE SIA IN GRADO DI SODDISFARE LA POTENZA NOMINALE DEL DISPOSITIVO.
-  FARE ATTENZIONE A BLOCCARE IL MORSETTO DI USCITA PRIMA DI ACCENDERE IL DISPOSITIVO.



**ATTENZIONE**

**RISCHIO DI SCOSSE  
ELETTRICHE NON APRIRE**



Il dispositivo è stato progettato e fabbricato per garantire la vostra sicurezza personale. TUTTAVIA UN UTILIZZO NON CORRETTO PUO' PROVOCARE RISCHI DI SCOSSE ELETTRICHE E DI INCENDI.

Per non compromettere le protezioni incorporate nel prodotto, rispettare le seguenti regole di base relative all'installazione, all'utilizzo e alla manutenzione. Si prega di leggere queste "Istruzioni sulla sicurezza" accuratamente prima dell'utilizzo.

- Leggere queste istruzioni.
- Conservare queste istruzioni.
- Prestare attenzione a tutti gli avvertimenti.
- Seguire tutte le istruzioni.
- Non utilizzare il dispositivo vicino all'acqua.
- Pulire esclusivamente con un panno asciutto.
- Non ostruire le aperture per la ventilazione. Installare il dispositivo attenendosi alle istruzioni del produttore.
- Non installare vicino a fonti di calore quali radiatori, termoregolatori, stufe o altri apparecchi che producono calore.
- Non manomettere la funzione di sicurezza presa polarizzata o con messa a terra. Una spina polarizzata è dotata di due lamelle, una è più grande dell'altra. Una spina con messa a terra è dotata di due lamelle e di una terza punta per la messa a terra. La lamella più grande o la terza punta sono installati per garantire la vostra sicurezza. Se la spina in dotazione non si adatta alla vostra presa, contattare un elettricista per sostituire la presa obsoleta.
- Proteggere il cavo di alimentazione per evitare che possa essere calpestato o schiacciato prestando particolare attenzione alle spine, alle prese di derivazione e al punto in cui fuoriescono dal dispositivo.
- Utilizzare esclusivamente gli attacchi/accessori specificati dal produttore.
- Utilizzare solo il carrello, il supporto, il cavalletto, la staffa o il tavolino specificati dal produttore, o venduti con il dispositivo. Se si utilizza un carrello, prestare attenzione quando si sposta la combinazione carrello/apparecchio per evitare danni alle persone causati dal ribaltamento.
- Scollegare il dispositivo durante i temporali o quando rimane inutilizzato per lunghi periodi del tempo.
- Per la manutenzione e l'assistenza rivolgersi a personale tecnico qualificato. Gli interventi di manutenzione e di riparazione sono necessari quando il dispositivo è stato danneggiato in qualsiasi modo, come ad esempio se il cavo di alimentazione o la spina sono stati danneggiati, se è stato versato del liquido o sono caduti oggetti sul dispositivo, se il dispositivo è stato esposto a pioggia o a umidità, se non funziona in modo normale o se caduto.
- Il dispositivo deve essere collegato a una presa di corrente con collegamento protetto da messa a terra
- Nel caso in cui presa elettrica o un idoneo accoppiatore viene utilizzato come dispositivo di scollegamento, il dispositivo di scollegamento deve rimanere sempre facilmente accessibile.



**IL PRODUTTORE DECLINA OGNI RESPONSABILITA' PER DANNI PROVOCATI A PERSONE, COSE O DATI A CAUSA DI UN COLLEGAMENTO NON CORRETTO O MANCANTE DELLA MESSA A TERRA.**

**CONTATTARE IL CENTRO DI ASSISTENZA AUTORIZZATO PER ESEGUIRE LA MANUTENZIONE ORDINARIA E STRAORDINARIA.**

**E' ASSOLUTAMENTE NECESSARIO CONTROLLARE QUESTI REQUISITI FONDAMENTALI SULLA SICUREZZA E, IN CASO DI DUBBI, RICHIEDERE UN CONTROLLO ACCURATO DA PERSONALE QUALIFICATO.**



# Regulatory information

5

If the time arises to throw away your product, please recycle all possible component.



This symbol indicates that when the end-user wishes to discard this product, it must be sent to separate collection facilities for recovery and recycling. By separating this product from other household-type waste, the volume of waste sent to incinerators or land-fills will be reduced and natural resources will thus be conserved.

The Waste Electrical and Electronic Equipment Directive (WEEE Directive) aims to minimise the impact of electrical and electronic goods on the environment. Powersoft S.p.A. comply with the Directive 2012/19/EU of the European Parliament on waste electrical and electronic equipment (WEEE) in order to reduce the amount of WEEE that is being disposed of in land-fill site.

All of our products are marked with the WEEE symbol; this indicates that this product must NOT be disposed of with other waste. Instead it is the user's responsibility to dispose of their waste electrical and electronic equipment by handing it over to an approved reprocessor, or by returning it to Powersoft S.p.A. for reprocessing. For more information about where you can send your waste equipment for recycling, please contact Powersoft S.p.A. or one of your local distributors.

Manufacturer:  
Powersoft S.p.A.  
via E. Conti 5  
50018 Scandicci (Fi)  
Italy



We declare that under our sole responsibility the products:  
Model Names: LOTO

Intended use: DSP Module

Are in conformity with the provisions of the following EC Directives, including all amendments, and with national legislation implementing these directives:

2014/35/EU	Low Voltage Directive
2014/30/EU	Electromagnetic Compatibility Directive
2011/65/EU	RoHS Directive

The following harmonized standards are applied:

EN 55032: 2012  
EN 55035: 2017  
EN 62368-1: 2014

Scandicci,  
April 2019

Luca Lastucci  
Managing Director

For compliance questions only: [compliance@powersoft.it](mailto:compliance@powersoft.it)

## Electrostatic Discharge (ESD)

Electrostatic discharge (ESD) is one of the most significant factors leading to damage and failure of a wide variety of electronic components.

Poor handling can cause internal damage, which is invisible. This internal damage can then cause electrical failure or reliability problems.



It is recommended that all workstations where Electrostatic Discharge Sensitive devices (ESDS) and assemblies are handled outside of full static protection packaging (i.e. within static control areas) should be provided with some form of ground conductive or dissipative flooring.

## Introduction

LOTO is a 4OUT processing platform specifically designed to provide advanced DSP functions to any powered loudspeaker.

LOTO shares the same processing capabilities of Powersoft high-end X-Series rack amplifiers platform, delivering up to 2 sec of input delay, multi-layer input EQ, raised cosine filters, custom FIR and IIR equalizers, as well as TruePower™, RMS and Peak limiters, Active DampingControl™, and Live Impedance readout.

### 7 : 1. LOTO – DSP CORE

The core of the system is the DSP board, available in two different hardware versions:

#### LOTO – ADVANCED

2x Digital inputs-capable blocks, includes fail-safe backup strategy across three different input sources:

- Dante/AES67 (2x Channels)
- AES3 (1x Stream)
- Analog (2x Balanced Inputs)

#### LOTO – BASIC

Up to 2x Balanced Analog inputs.

One input can be disabled if not required.

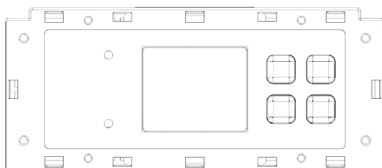
### 7 : 2. LOTO – INTERFACE

Powersoft provides off-the-shelf solutions for LOTO interfacing, for both the Basic/Advanced CORE versions.

The interface assemblies houses the DSP core-board and includes different set of input connectors, addressing the main target applications for LOTO DSP.

The Interfaces comes pre-assembled with DSP CORE and are meant for LOTO – Heatsink as well as custom-built mechanical solutions.

All interface-boards provides user interaction via Pushbuttons or optional TFT Display:

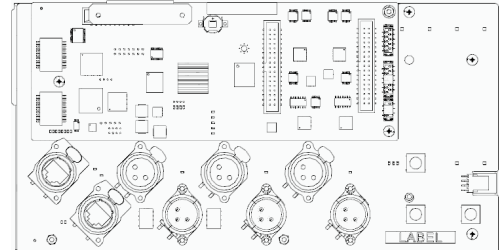


#### LOTO – ADVANCED 2D

Houses Advanced DSP CORE and includes:

- 2x Analog Input XLRs (with link OUT)

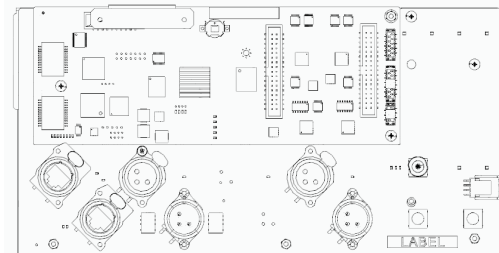
- 1x AES3 Input XLR (with link OUT)
- 2x Switched Ethernet ports (Neutrik etherCON)



#### LOTO – ADVANCED 1D

Houses Advanced DSP CORE and includes:

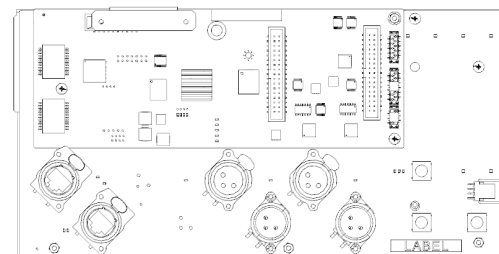
- 1x Analog Input XLRs (with link OUT)
- 1x AES3 Input XLR (with link OUT)
- 2x Switched Ethernet ports for Dante + Remote Control (Neutrik etherCON)



#### LOTO – BASIC 2

Houses Basic DSP CORE and includes:

- 2x Analog Input XLRs (with link OUT)
- 2x Switched Ethernet ports for Remote Control (Neutrik etherCON)



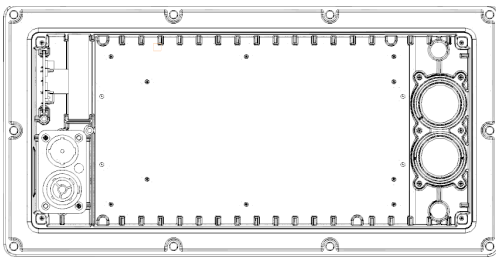
## 7:3.LOTO – HEATSINK

Cast-aluminum heatsink specifically designed to house LOTO DSP core+interface along with a power amplifier module from the following range:

- LiteMod4HC
- MiniMod4
- LiteMod std.
- LiteMod HV

The heatsink comes with Neutrik PowerCon TRUE1 mains input w/link OUT, mains filter, fan and amplifier outputs connectors.

The back portion of the heatsink is completely airtight, for ease of design and assembly of loudspeakers, since the electronics do not require a dedicated volume separated from the acoustic volume of the cabinet.



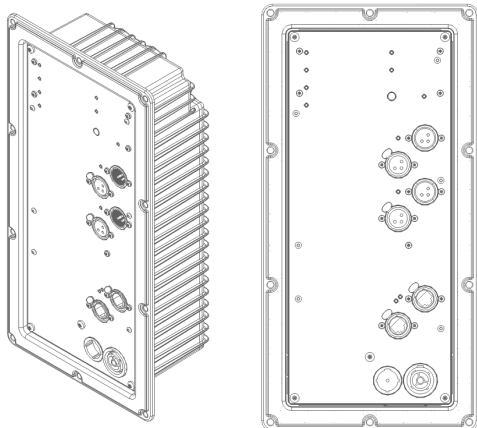
## 7:4.LOTO – IK SOLUTIONS

Powersoft offers three integrated-solutions-kits based on LOTO DSP and Heatsink.

The kits includes all required components and require assembly by the OEM manufacturer.

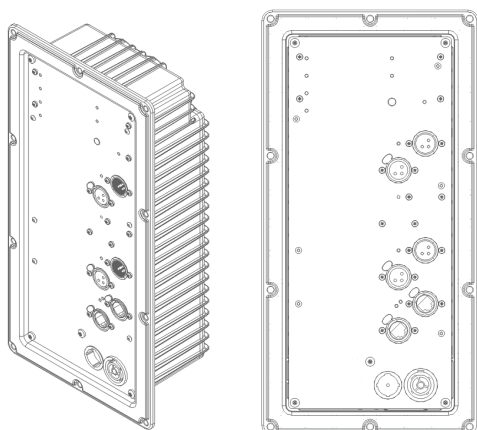
Please refer to the LOTO IK User Guide

## 7 : 4.2. LOTO Basic2



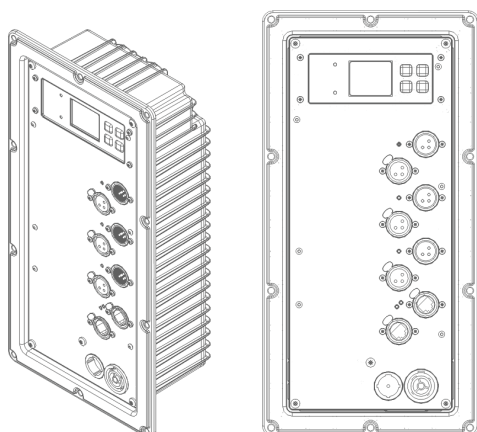
Code	Qty	Description	Description Details
SMC01056.R	1	LOTOPX BASIC2 DSP-ASY	Assembly including input interface
HS000010.R	1	LOTO HEATSINK	Preassembled Heatsink
ME001271.R	1	Front Panel BASIC2	metal plate
KTV00602.R	1	LOTO KIT SCREWS	Kit Screws
KTA00602.R	1	LOTO KIT LIGHTPIPE <u>BTN</u> CAP	Kit Accessories
PFXXXXXX	1	AMPLIFIER MODULE	Chosen one among the allowed modules listed above.
SM001172.R	1	LOTOPX/STD/SPKOUT4	4 ways speaker connector adaptor <b>For Minimod4 and Litemod4HC</b>
SM001173.R	1	LOTOPX/STD/SPKOUT2	2 ways speaker connector adaptor <b>For Litemod and Litemod HV</b>

## 7 : 4.3. LOTO Advanced 1D



Code	Qty	Description	Description Details
SMC01057.R	1	LOTOPX ADV1 DSP-ASY	Assembly including input interface
HS000010.R	1	LOTO HEATSINK	Preassembled Heatsink
ME001337.R	1	Front Panel ADV1	metal plate
KTV00602.R	1	LOTO KIT SCREWS	Kit Screws
KTA00602.R	1	LOTO KIT LIGHTPIPE <u>BTN</u> CAP	Kit Accessories
PFXXXXXX	1	AMPLIFIER MODULE	Chosen one among the allowed modules listed above.
SM001172.R	1	LOTOPX/STD/SPKOUT4	4 ways speaker connector adaptor <b>For Minimod4 and Litemod4HC</b>
SM001173.R	1	LOTOPX/STD/SPKOUT2	2 ways speaker connector adaptor <b>For Litemod and Litemod HV</b>

## 7 : 4.1. LOTO Advanced 2D

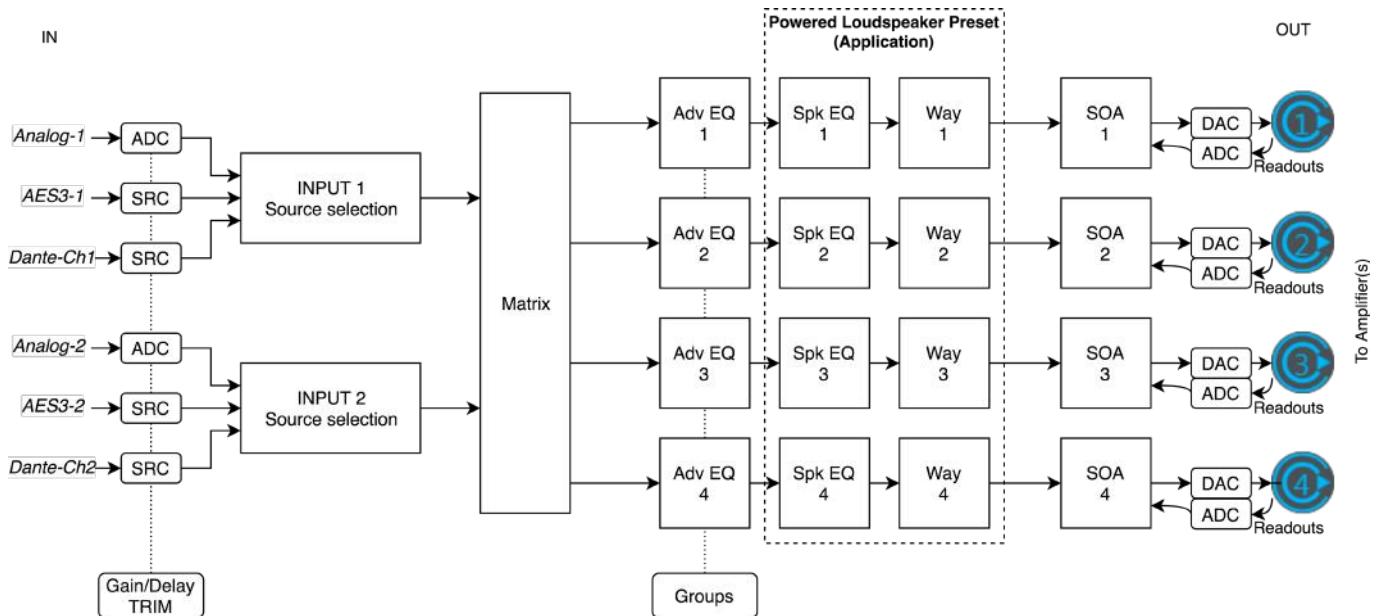


Code	Qty	Description	Description Details
SMC01058.R	1	LOTOPX ADV2D DSP-ASY	Assembly including input interface
HS000010.R	1	LOTO HEATSINK	Preassembled Heatsink
ME001338.R	1	Front Panel ADV2D	metal plate
KTV00602.R	1	LOTO KIT SCREWS	Kit Screws
KTD00602.R	1	LOTO KIT DISPLAY	kit for Display assembly
FR000004.R		LOTOPX KEYBOARD DISPLAY	Display
PFXXXXXX	1	AMPLIFIER MODULE	Chosen one among the allowed modules listed above.
SM001172.R	1	LOTOPX/STD/SPKOUT4	4 ways speaker connector adaptor <b>For Minimod4 and Litemod4HC</b>
SM001173.R	1	LOTOPX/STD/SPKOUT2	2 ways speaker connector adaptor <b>For Litemod and Litemod HV</b>

# Processing architecture

## Overview

The following diagram highlights the processing architecture of LOTO DSP:



The signals flows from left to right through:

- Source Selection

The Source Selection blocks receive up to three sources (inputs) handling the backup strategy and gain/delay trim. End-users will configure the Source Selection according to each specific use-case in the field

- Matrix

The Matrix connects the Source Selection blocks to the loudspeakers. End-users will configure the Matrix according to each specific use-case in the field

- Advanced EQ

The Advanced EQ (Adv EQ) blocks provides Gain, Shading, Delay and Raised-Cosine EQ reserved to end-users for system tuning and alignment in the field. Additive processing through Groups also applies to the Adv EQ

- Speaker EQ

The Speaker EQ (Spk EQ) blocks provides Crossovers, BiQuads and FIR filters for multiway loudspeaker tuning, as a single Spk EQ block can drive up to four Ways (see Speaker Configuration). The loudspeaker manufacturer will use the Spk EQ blocks as part of the Powered Speaker Preset (Application)

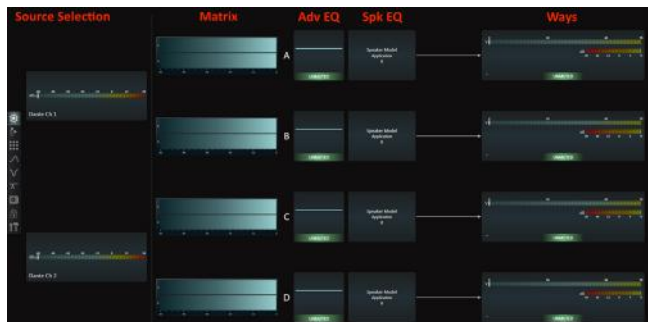
- Ways

Each Way block provides Crossovers, BiQuads, FIRs and Limiters on top of Live Impedance measurement and Diagnostic tools. The loudspeaker manufacturer will use Way blocks for preset making as part of Powered Loudspeaker Preset (Application)

- SOA

The Safe Operating Area blocks provides interfacing to match the DSP to the connected Amplifier Module(s). This includes matching sensitivity and scaling readouts as well as additional SOA limiters (for specific amplifier modules). SOA is reserved to Powersoft and hidden from GUI

The following picture shows the processing scheme GUI within ArmoniaPlus:



Please refer to the following paragraphs for an in-depth description of all processing blocks.

## 8:1.Source Selection

Each Source Selection block provides independent control over input priority and backup strategy mode:



The output of each Source Selection block will feed the Matrix, according to Source Selection configuration:

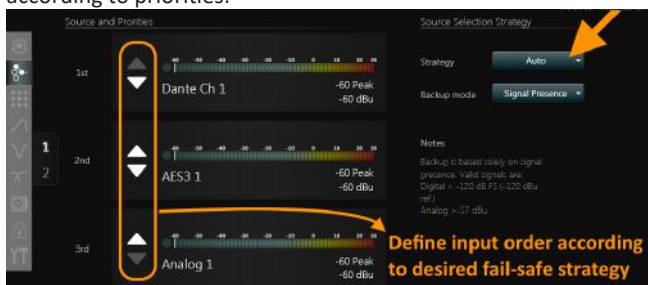
- Source Selection Strategy: Force

Source forced to FIRST slot



- Source Selection Strategy: Auto

Provides failover backup across up-to three different sources according to priorities:



Backup is based solely on signal presence. Valid signals are:  
Digital > -120dB FS (-120dBu ref.)  
Analog > -57dBu

All thresholds referred post Amplifier-Input-Referencing trim.

i.e. in the example above, the output to Matrix will be:

- Dante if > -120dB FS
- AES3 if > -120dB FS & Dante < -120dB FS
- Analog if > -57dBu & Dante & AES3 < -120dB FS

The Amplifier Inputs Referencing provides Gain trim for level-matching and input delay for time alignment of digital vs analog sources.



Note!

The Inputs Referencing settings applies to all sources of the same type!

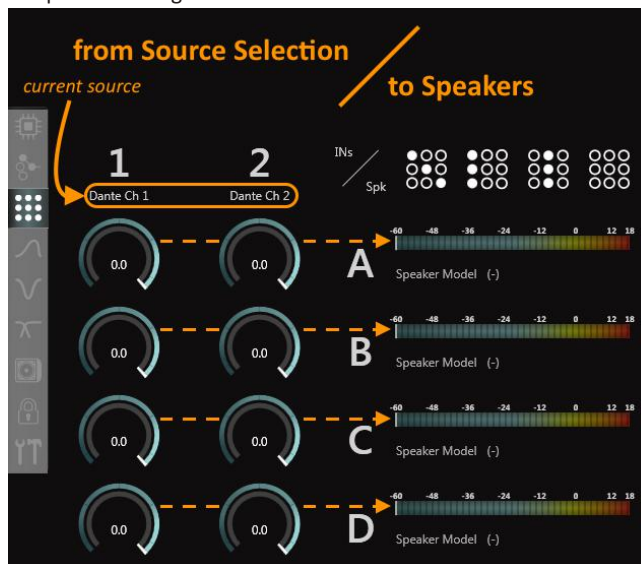
i.e. Analog Trim and Delay applies to both Analog IN1 & IN2, etc.

## 8:2.Matrix

The Matrix block interfaces the Source Select to the Speaker blocks, feeding Speakers with the current source for each Source Select block according to Matrix gains, where:

- Columns= inputs (Source Select outputs)
- Rows= output (to Speakers)

The Matrix GUI will show up to four rows (speakers) according to Speaker Configuration.



Each I/O crossing provides continuous gain control from 0dB to -inf., for mixing two inputs with custom levels or feeding Speakers with classic L+R mono mix (-6dB).



## 8:3. Advanced EQ

LOTO DSP provides 1x Adv EQ block for each speaker (single/multiway), supporting:

- Gain (+15 ~ -60dB)
- Shading (0 ~ -15dB)
- Polarity
- Delay (up to 2sec)
- EQ (raised cosine), up to 96 filters (32x layer, 3x layers)
- Up to 8x Groups

End-users will tune and align loudspeaker systems using the Advanced EQ block along with Groups.



Each Advanced/Array Group provides:

- ▷ Gain (+15 ~ -40dB)
- ▷ Polarity
- ▷ Delay (up to 2sec)
- ▷ EQ (raised cosine), up to 96 filters (32x layer, 3x layers)

All Groups assigned to an Adv EQ block provides additive processing, meaning that:

- Resulting Gain will be the arithmetic sum (in dB) of all Gain adjustment applied by assigned Groups and/or on the Advanced EQ block itself (up to +135dB MAX)



- Resulting Delay will be the sum of all delay applied by Groups and/or on the Advanced EQ block itself (up to 2sec MAX)

- Resulting Polarity will be the result of all flips applied by Groups and/or the Advanced EQ itself

- Resulting EQ curve will be “sum” of all filters applied by Groups or the Advanced EQ itself



### Shading vs Gain

Shading is an advanced tool for gain tapering of arrays. While attenuating a loudspeaker, the Shading feature also automatically lowers the limiter threshold by the same amount (in dB), ensuring uniform dynamic response of the system

## 8:4. Speaker EQ

LOTO DSP provides 1x Speaker EQ block for each speaker (single/multiway), supporting:

- ▷ Custom FIR filter  
2048 taps-equivalent @48kHz  
Supported file types (\*.txt) (\*.csv)
- ▷ Hi-Pass filter  
Bessel/Butterworth/Linkwitz-Riley up to 48dB/oct
- ▷ Low-Pass filter  
Bessel/Butterworth/Linkwitz-Riley up to 48dB/oct
- ▷ BiQuad filters (8x)  
Peaking/ Band-Pass/ Band-Stop/ Low-Shelving/ Hi-Shelving/ All-Pass/ Low-Pass/ Hi-Pass

The loudspeaker manufacturer will use this tools to shape the overall response of a multiway speaker



## 8:5. Way block

LOTO DSP provides up to four Way blocks each featuring EQ, Limiters, Damping Control, Live Impedance measurement and Diagnostic.

### 8:5.1. Way Eq

Independent output EQ for each transducer, featuring:

- ▷ Gain (+15 ~ -60dB)
- ▷ Polarity
- ▷ Delay (up to 100msec)
- ▷ Custom FIR filter  
2048 taps-equivalent @48kHz  
Supported file types (\*.txt) (\*.csv)
- ▷ Hi-Pass filter  
Bessel/Butterworth/Linkwitz-Riley up to 48dB/oct
- ▷ Low-Pass filter  
Bessel/Butterworth/Linkwitz-Riley up to 48dB/oct
- ▷ BiQuad filters (16x)  
Peaking/ Band-Pass/ Band-Stop/ Low-Shelving/ Hi-Shelving/ All-Pass/ Low-Pass/ Hi-Pass



### 8 : 5.2. Limiters

Provides individual limiting and protection for each transducer, featuring:

- RMS limiter

Feed-forward limiter including soft-knee and frequency-shaping capability

- Peak limiter

Feed-forward limiter including soft-knee and frequency-shaping capability

- Clip limiter

Feed-forward limiter w/ look-ahead

- True Power limiter

Feedback limiter. Threshold based on average product of RMS voltage and current (measured)

- Current limiter

Feedback limiter. Threshold based on RMS current (measured)



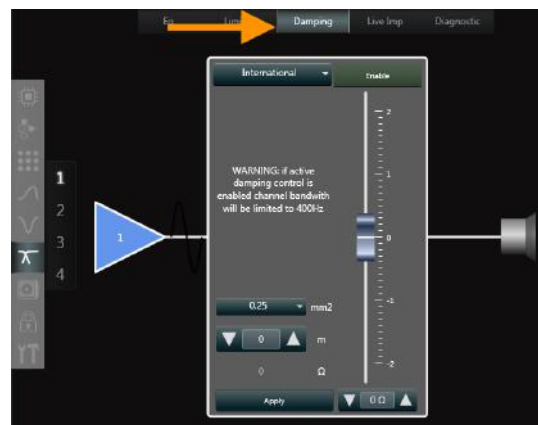
### 8 : 5.3. Damping

Damping factor control is a unique feature of Powersoft Amplifier and DSP platforms.

Damping control find its typical application in cable-loss compensation for rack amplifier-powered subwoofers, while in Powered-Loudspeaker applications the Damping control mainly provides an extra degree of freedom over the Mid/Sub transient response.

Simulating a positive/negative output-series resistor in the range of  $+2\Omega \sim -2\Omega$ , Damping control can actively contribute to tailoring a loudspeaker response for a wider range of Applications and use cases.

Damping control can be used to shape the response of a loudspeaker and then locked to prevent changes, OR can be left accessible to the end-user to play with during system tuning/toning.



### 8 : 5.4. Live Impedance

LOTO provides real-time loudspeaker impedance measurement.

LOTO also provides the loudspeaker manufacturer with the option of saving reference impedance-curves on-board the DSP within preset (Applications).

The end-user will then compare the on-board "Preset" curves with the real-time curve for fault-finding and troubleshooting.

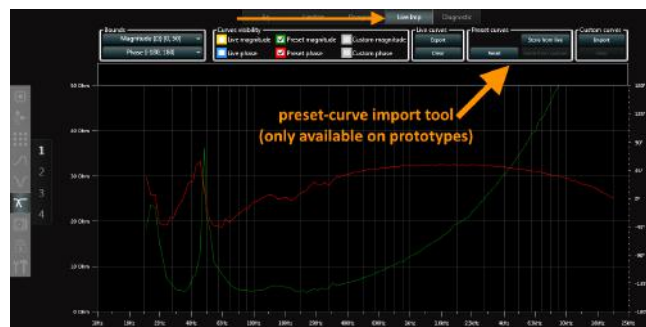


FIGURE 1: Live Impedance page on LOTO Prototypes

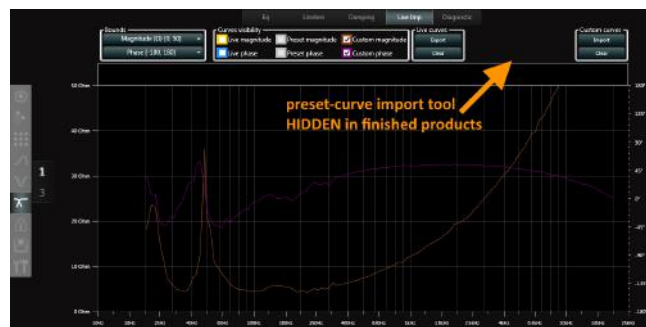


FIGURE 2: Live Impedance page on finished products

### 8:5.5. Diagnostics

LOTO provides extensive loudspeaker/amplifier diagnostic tools reserved to the end-user for loudspeaker troubleshooting and fault-finding.



#### Pilot Tone Generator

Generate a pure sine-tone at a specific frequency and amplitude, injecting it at the very end of the processing chain

#### Pilot Tone Voltage Monitor

Pilot-tone voltage monitor is used along with pilot-tone generator to trigger alarms in case of amplifier fault.

Auto-detect the amplitude of the pre-generated pilot-tone, if the tone is out of range, alarms are triggered.

#### Pilot Tone Load Monitor

Pilot-tone load monitor is used along with pilot-tone generator and line-termination loads to trigger alarms in case of faulty wirings.

Detect the load impedance at the defined frequency, if the impedance is out of range, alarms are triggered.

#### Nominal Impedance Detection

Nominal impedance detection calculates the average impedance of the load (broadband) and trigger alarms if the impedance is out of the defined range.

#### Note!

Although the Diagnostic page configuration is saved within the Application preset file, the Preset locking password DO NOT lock the Diagnostic page.

The end-user will be able to customise and enable/disable alarms.

# Memory

## 9 : 1. Memory structure

LOTO on-board memory is organised per banks (A to F) of four slots (1 to 24), as shown in the following table.

Bank	Slot	File Type	Notes
A	1	PAM (+ PSPK)	Factory-default Snapshot + Application#1 (mandatory)
	2	PSPK	Applications 2 to 4 (mandatory)
	3	PSPK	
	4	PSPK	
B	5	PSPK	Applications 5 to 8 (optional)
	6	PSPK	
	7	PSPK	
	8	PSPK	
C	9	PSPK	Applications 9 to 12 (optional)
	10	PSPK	
	11	PSPK	
	12	PSPK	
D	13	PSPK	Applications 13 to 16 (optional)
	14	PSPK	
	15	PSPK	
	16	PSPK	
E	17	PSPK	Applications 17 to 20 (optional)
	18	PSPK	
	19	PSPK	
	20	PSPK	
F	21	PAM / PSPK	(Optional) Configurable for: Applications (21 to 24) OR User-memory (Snapshots 1 to 4)
	22	PAM / PSPK	
	23	PAM / PSPK	
	24	PAM / PSPK	

To best suit different projects, the memory banks are independently configurable by the loudspeaker manufacturer as follow:

- Without user memory

Up to 6x banks for up to 24x different Applications.

Minimum is 1x bank (A) for 4x different Applications.

Notice!

All active banks must be filled with Applications!

- With user memory

Up to 5x banks for up to 20x different Applications plus user-memory bank.

Minimum is 1x bank for 4x different Application.

Notice!

All active banks must be filled with Applications!

For memory navigation and preset recall, please refer to the relevant user-interaction section:

- LEDs + Pushbuttons
- Display
- ArmoníaPlus

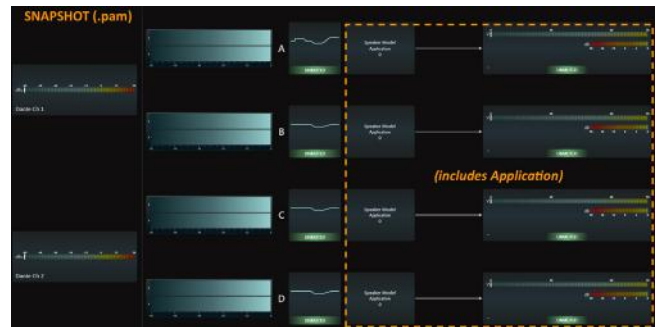
## 9 : 2. Preset-file types

LOTO handles two different preset-file types, Applications (\*.pspk) and Snapshots (\*.pam):

### 9 : 2.1. Snapshots

Snapshots contains:

- ▷ Source selection (including backup strategy and settings)
- ▷ Matrix settings
- ▷ Application
- ▷ Advanced EQ
- ▷ DSP options (General, Network config, Dante settings, Energy-save)



End-users will use Snapshots to recall a specific use-case for a loudspeaker, including a factory-defined Application on top of Input, Matrix, Adv EQ and global settings.

The end-user can save a Snapshot on a local PC via ArmoníaPlus software.

ArmoníaPlus is also required to recall a pre-saved Snapshot.

Optionally, the loudspeaker manufacturer can reserve a memory bank to the end-user to save Snapshots.

In this case, the end-user will be able to store Snapshots also on-board the DSP memory via ArmoníaPlus.

Snapshots stored on-board the DSP can be recalled locally (via pushbutton/display) or remotely via ArmoníaPlus.

#### Factory-default snapshot

The factory-default Snapshot is dedicated to the loudspeaker manufacturer.

The scope of the Factory-default Snapshot is providing the Loudspeaker manufacturer with the freedom of selecting the “factory-default” parameters for a specific product.

To achieve this, the loudspeaker manufacturer will create this Snapshot during Prototyping, defining the entire set of configurations (including Application) that the end-user will recall with a factory-reset command.

#### Note!

The Factory-default Snapshot (\*.pam) must always contain a valid Application:

- The Application-portion of the factory-default Snapshot is recalled by simply navigating the on-board memory
- The entire Factory-default Snapshot (including Application) is recalled via dedicated pushbuttons combination/display sub-menu

The factory-default Snapshot is stored in memory Slot#1 (see Memory Structure for more details).

## 9:2.2. Applications

Applications (Powered Speaker Preset) are a subset of Snapshots, containing:

Speaker configuration

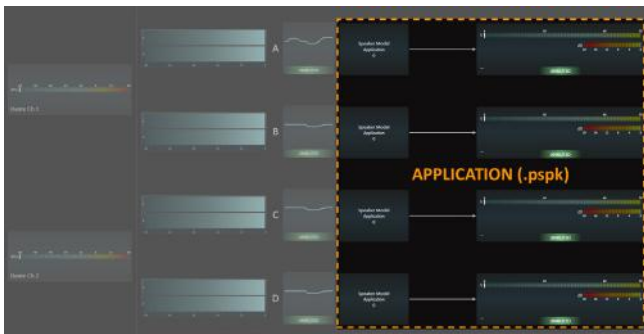
- Speaker EQ
- Ways block (EQ, Limiters, Damping, Live Imp, Diagnostics)
- Preset locking

Applications are factory-defined by the loudspeaker manufacturer.

The loudspeaker manufacturer will fill LOTO memory with a set of pre-made Applications, covering different use-cases for the same loudspeaker (or set of loudspeakers for 2.1/1.1 systems).

Applications can be recalled locally (via pushbutton/display) or remotely via ArmoníaPlus.

The end-user cannot override the factory-defined Applications.



*A Bundle of Speaker Preset*

*If you are familiar with Speaker Preset files for Powersoft's rack amplifiers platform, imagine Powered Speaker Preset as a bundle of different Speaker Preset!*

*PSPK file format is well suited for 2.1/1.1 systems, where a bundle of Speaker Preset must change simultaneously with the push of a button*

### Note!

A single LOTO-based loudspeaker is compatible with Applications including any combination of Speaker configuration, I.E. A powered subwoofer with satellites outputs can seamlessly drive full range or bi-amp speakers.

## User interaction

User-interaction for LOTO – DSP comprise three different methods: LEDs + Pushbuttons / Display / ArmoniaPlus.

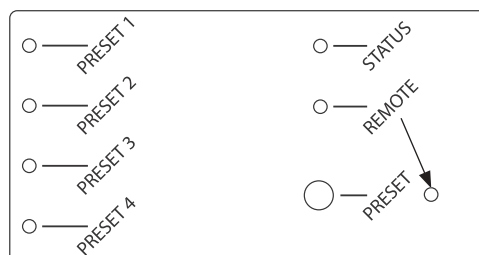
ArmoniaPlus is always available to the end-user for controlling the DSP, while the choice of hardware interface could be either Display or LEDs + Pushbuttons.

The following paragraphs describes the three different user-interaction methods for LOTO in details.

### 10 : 1.LEDs + Pushbuttons

The LEDs + Pushbuttons interface provides:

- ▷ Preset LEDs
- ▷ Status LED
- ▷ Remote LED
- ▷ Preset Pushbutton
- ▷ Reset Pushbutton



#### 10 : 1.1. Status LED

The RGB Status LED provides the following information:

Type	Event/Condition	Color	Status
All Good	Normal operation	Green	Solid ON
Limit	Gain Reduction $\geq 2\text{dB}$ (RMS/Peak/Power/Current limiters on any output)	Yellow	Solid ON
Clip	Input clip (analog $\geq 26\text{dBu}$   digital $\geq 0\text{dBFS}$ )	Red	Solid ON
	Output clip (Clip limiter Gain Reduction $\geq 2\text{dB}$ )(*)	Red	Solid ON
Energy Save	Energy-save is enabled and active	Blue	Solid ON
Call	ArmoniaPlus call	White	Blink
Warning	Over temp	Yellow	Blink @4Hz, 40%DC
Fault/Alarm	HW fault	Red	Blink @4Hz, 40%DC
	AMP protection		
	Pilot Tone Monitor out-of-range		
	Load Monitor out-of-range		
	Nominal Impedance out-of-range		

(\*) any output (including SOA)



### 10:1.2. Remote LED

The RGB Remote LED indicates if the DSP is remotely connected to a client (ArmoniaPlus), according to the following color-coding;

Condition	Color	Status
Client Connected	Green	Solid ON
Client not Connected	OFF	OFF
Client Calling	White	Blink

### 10:1.3. Preset LEDs

The RGB Preset LEDs indicates the currently loaded Application or Snapshot (where available), when recalling from local memory preset.

When loading and/or modifying Applications or Snapshot via ArmoniaPlus, the preset LEDs will turn OFF, indicating that the current preset is NOT included in local memory, but software defined.

The preset LEDs also provide visual feedback for local memory navigation.

#### ▷ Colours

The Preset LEDs provides a dedicated colour during each memory bank.

The memory bank vs colour relationship is configurable via ProManagerPlus.

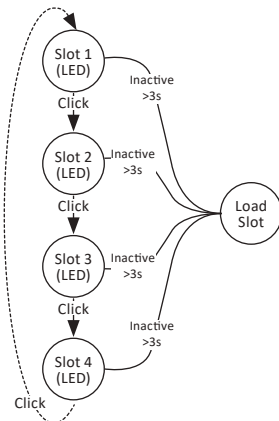
### 10:1.4. Preset pushbutton

The Preset pushbutton is used to navigate the on-board memory, according to Memory configuration.

The “Memory navigation” configuration defines the PRESET pushbutton behaviour:

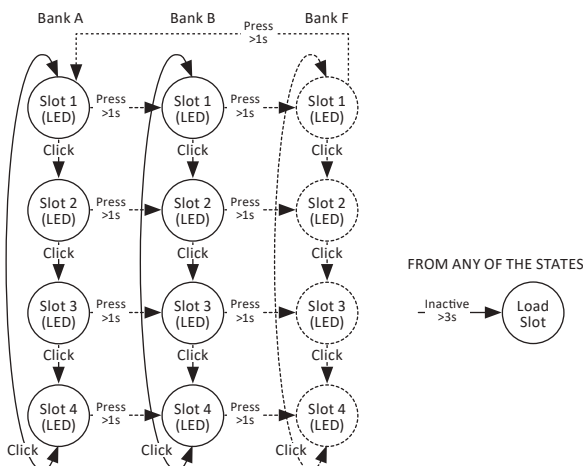
#### ▷ List Mode

LOTO will scroll all active memory slots in sequence at every pushbutton click (1 to 24 or less according to memory configuration)



#### ▷ Bank Mode

LOTO will scroll all four slots (1 to 4) in a bank at every pushbutton click. A longer pushbutton press (>1sec) will scroll to the next active bank.



### Note!

The Preset pushbutton is also used for:

- ArmoniaPlus MATCH feature
- ArmoniaPlus CALL feature
- Factory-default reset along with Reset pushbutton

### Note!

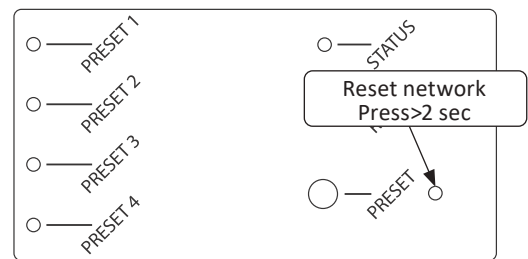
Preset selection via pushbutton is inhibited when the DSP is connected to ArmoniaPlus (only CALL available)

### 10:1.5. Reset Pushbutton

The Reset pushbutton allows the end-user to restore either the DSP Factory-default settings or resetting the LOTO network interface to default (Auto IP).

#### Network Reset

Push the reset button for >2sec to reset the DSP Network interface to DHCP.



The Network reset command will:

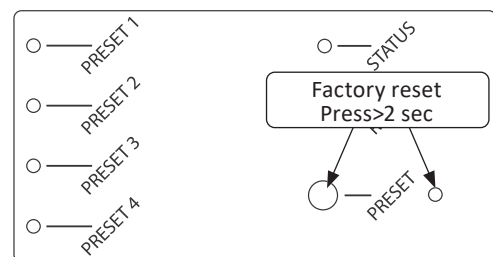
- ▷ Reset DEVICE Network interface to DHCP (Dante network not affected)
- ▷ Reboot DSP

### Note!

The Network reset command DO NOT apply to Dante Network configuration!

#### Factory Reset

Press the Reset + Preset pushbuttons simultaneously (>2sec) to reset to factory default.



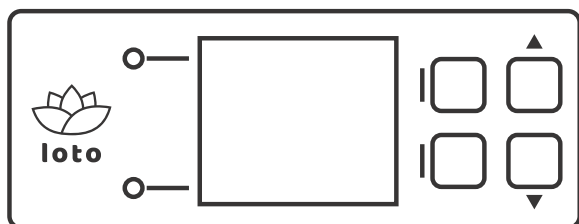
Reset to factory-default will:

- ▷ Reload the Factory-default Snapshot
- ▷ Reload Application (Slot) #1
- ▷ Reset Adv EQ
- ▷ Remove Groups
- ▷ Reset DEVICE Network interface to DHCP
- ▷ Reset DANTE Network interface to DHCP
- ▷ Reboot DSP

For soft reset via ArmoniaPlus, see User Interaction->ArmoniaPlus Soft reset



## 10 : 2. Display



The 1.8" TFT 160x128 RGB display provides quick and easy access to LOTO features, controls and information.

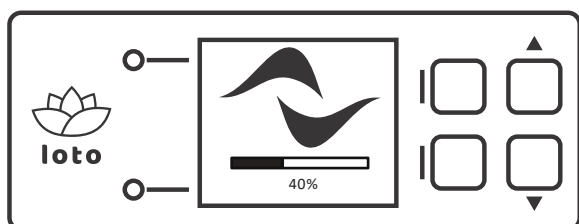
The Display assembly includes 4xPushbuttons for menu navigation and data edit on top of 2xLEDs (RGB) for DSP status indication.

The TFT display is compatible with both LOTO – Basic/Advanced and replaces the LEDs + Pushbuttons user-interface solution.

The display also include an accelerometer for display rotation according to the loudspeaker orientation.

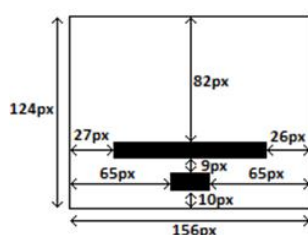
Despite the Display comes with a non-modifiable firmware, the GUI provides two degrees of customisation reserved to the loudspeaker manufacturer:

### 10 : 2.1. Startup splash



The display will show the startup SPLASH as soon as LOTO is powered up and for the entire duration of the DSP-boot process.

The display will also print a progress bar and percentage in foreground, according to this mask:



The custom startup SPLASH should be a (.png) image, 156x124pixels, 16bpp.

To include a custom SPLASH in a product, please refer to Custom Model – Display.

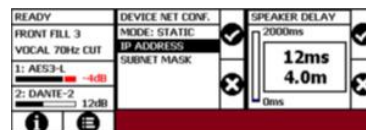
### 10 : 2.2. Color palette

The loudspeaker manufacturer can choose a colour theme for the display across the following:

#### Colorful



#### White



#### Green



#### GreenCyan



#### Black



#### Pink



#### Blue



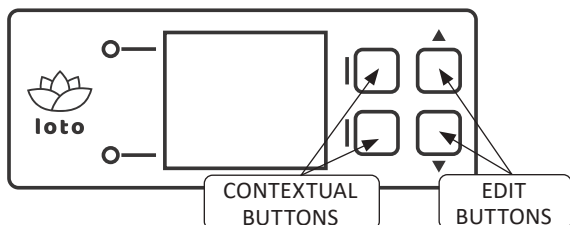
To define the display colour theme for a loudspeaker, please refer to Custom Model – Display.

## 10 : 3. Display Operating instructions

### 10 : 3.1. Pushbuttons

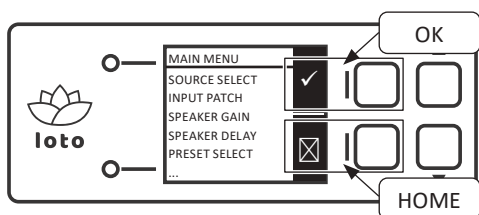
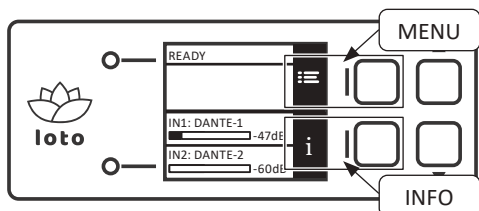
The display assembly for LOTO includes four pushbuttons:

- 2x Contextual
- 2x Edit

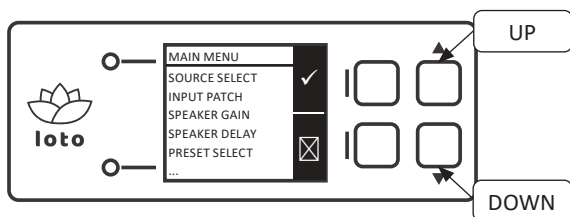


Contextual buttons are positioned close to the display window and their function is shown on the display itself.

These buttons are contextual since their function vary depending on the page shown, for example:

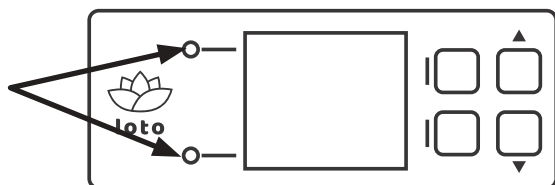


Edit buttons provide UP/DOWN navigation of menus and entries as well as gain/delay values editing.



### 10 : 3.2. LEDs

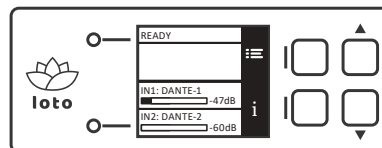
Currently not configured, reserved for future development



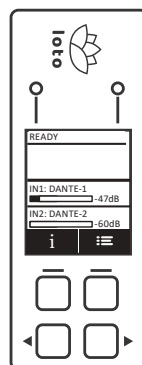
### 10 : 3.3. Display orientation

Currently, the display supports two orientations:

0 DEG



90 DEG



#### Note!

Rotating the display while powered-on does not affect the orientation.

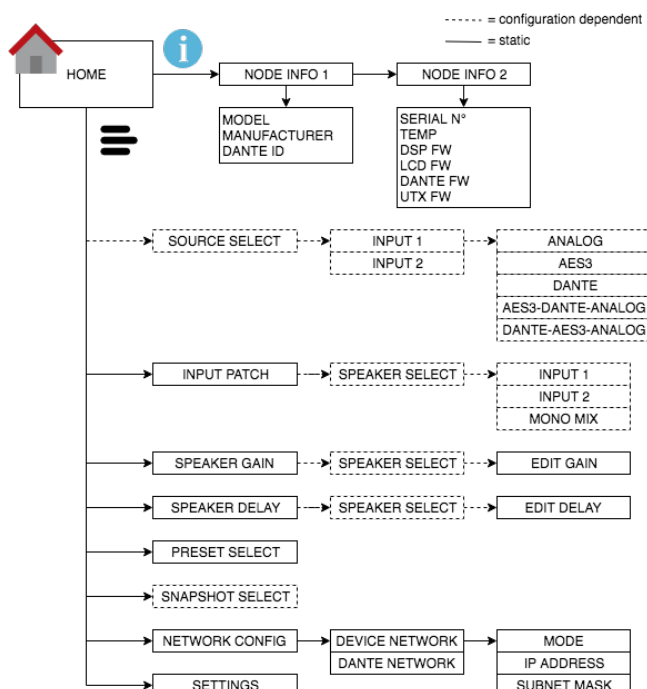
The Display polls the accelerometer only during power-on and rotates the display accordingly.

In order to adapt the display orientation to a new position, a DSP power cycle is required!

### 10 : 3.4. Menu navigation

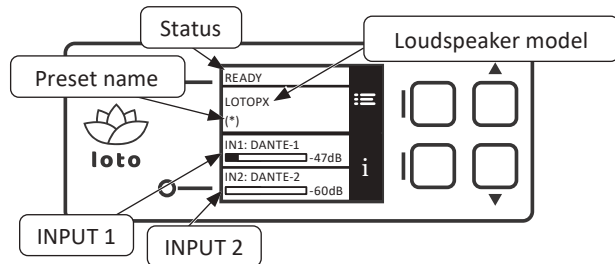
The following flowchart highlights the available menus and navigation.

Please note that some menu entries and/or options are configuration/Application-dependent.



## 10 : 4.Display GUI description

### 10 : 4.1. Home



#### Status

Indicates the amplifier status with a dedicated label and background colour.

Label	Priority	Event/Condition
READY	1 (LOW)	Normal Operation
PROTECT	2 (HIGH)	HW fault
		AMP protection
		Pilot Tone Monitor out-of-range
		Load Monitor out-of-range
		Nominal Impedance out-of-range

#### Loudspeaker model

Display the loudspeaker name.

After Production, this label display the loudspeaker model name as well as after a Factory Default Reset.

When Armonia is connected, this label display the name of the loudspeaker on the workspace (user defined).

When resetting the loudspeaker name to default in ArmoníaPlus, this label will display the loudspeaker model name and serial number as defined in ProManager:

“Model Name|Serial Number”

#### Preset name

Display the current preset name (Application/Snapshot).

After Production, this label will display the name of Application #1 (stored in slot #1).

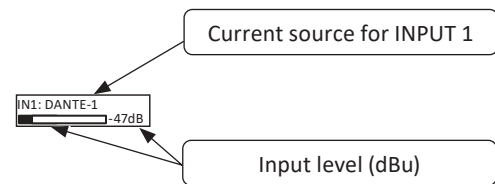
After recalling an Application from local memory, this label will display the Application name accordingly

After recalling a Snapshot from local memory, this label will display the Snapshot name accordingly.

When modifying an Application/Snapshot remotely via Armonia, this label will display “(\*)”, stating that the current preset is defined by the user.

#### Input 1

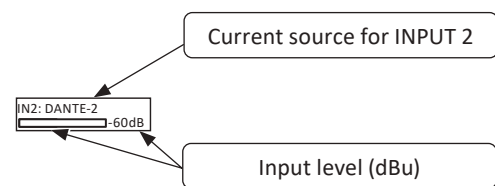
Display the current source and level for input 1\*



#### Input 2

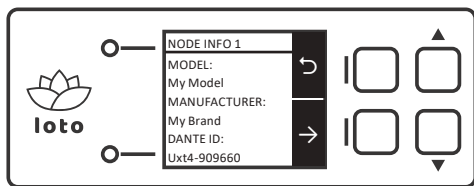
Display the current source and level for input 2\*

(Input 2 block NOT shown in LOTO – Basic, 1IN version).



\*according to Source Select and Backup Strategy configuration

## 10:4.2. Node info



### NODE INFO 1

MODEL:

Display the loudspeaker Model Name as defined in ProManagerPlus

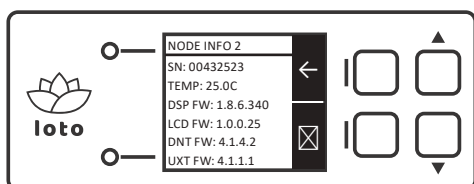
MANUFACTURER:

Display the loudspeaker manufacturer name according to OEM licensing.

DANTE ID:

Display Dante device name (user defined via Dante Controller/ArmoníaPlus).

Only shown for LOTO – Advanced



### NODE INFO 2

SN:

Display the loudspeaker serial number (defined during Production by ProManagerPlus)

TEMP:

Display the higher temperature across all connected amplifier(s)

DSP FW:

Display DSP firmware version

LCD FW:

Display LCD firmware version

DNT FW:

Display Dante firmware version.

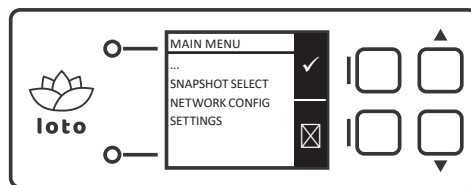
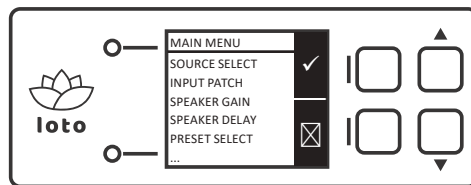
Only shown for LOTO – Advanced

UTX FW:

Display UTX firmware version.

Only shown for LOTO – Advanced

## 10:4.3. Main Menu



SOURCE SELECT

(only shown for LOTO – Advanced)

INPUT PATCH

(not shown for LOTO – Basic - 1x ANALOG IN)

SPEAKER GAIN

SPEAKER DELAY

PRESET SELECT

SNAPSHOT SELECT

(only shown if Snapshot bank enabled)

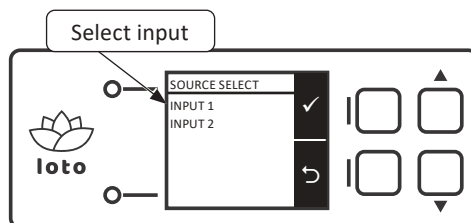
NETWORK CONFIG

SETTINGS

## 10:4.4. Source select

This menu allows easy configuration of Source Selection and Backup Strategy.

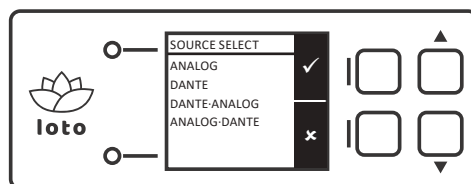
In LOTO – Advanced both input blocks are independently configurable and accessed via SOURCE SELECT sub-menu:



Select INPUT 1 to configure the Source Selection for input block 1.

Select INPUT 2 to configure the Source Selection for input block 2.

Both inputs will then display a list of options:



The list of sources for each input will be coherent with the DSP configuration (i.e. AES3 ON/OFF; 1 or 2 Analog inputs).

In this example, for Input block 1, only ANALOG and DANTE are shown, since AES was turned OFF in ProManagerPlus.

Selecting any entry will override both the Backup Strategy and Sources Priority, as follow:

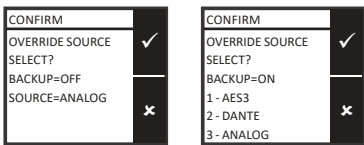
- Single Source (i.e. ANALOG)

Selecting a single source will disable the backup strategy, forcing Analog source to first priority

- Multiple Sources (i.e. DANTE-ANALOG)

Selecting multiple-sources options will enable the backup strategy and force the Sources priority accordingly

A self-explanatory confirmation page is always shown after selecting an option:



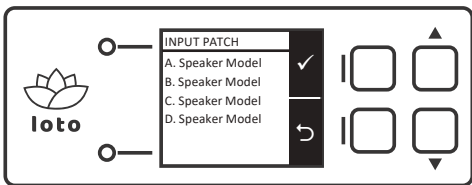
**Note!**

LOTO – Basic DO NOT include the SOURCE SELECTION menu

### 10 : 4.5. Input Patch

This menu allows easy configuration of Matrix from the loudspeaker(s) point of view.

The first page allows selecting a loudspeaker:

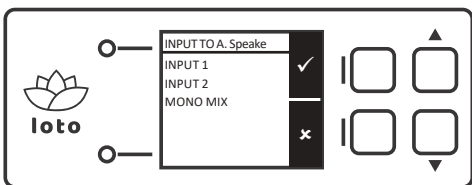


**Note!**

In case of single-speaker preset, the Display skips the Speaker Selection page and shows the Matrix configuration page automatically.

The list of available speakers is coherent with the Speaker Configuration and updates automatically when loading a preset (Applications/Snapshots).

Matrix configuration page



Matrix inputs

OPTION	IN 1	IN 2	Matrix output
INPUT 1	0dB	-inf	-> to speaker
INPUT 2	-inf	0dB	-> to speaker
MONO MIX	-6dB	-6dB	-> to speaker

The Input Patch provides three options for every loudspeaker, setting up the Matrix accordingly:

#### INPUT 1

IN1 to loudspeaker (@ 0dB)



#### INPUT 2

IN2 to loudspeaker (@ 0dB)



#### MONO MIX

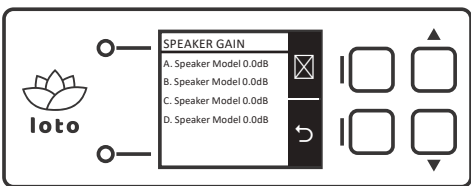
IN1+IN2 to loudspeaker (@ -6dB)



### 10 : 4.6. Speaker gain

This menu allows easy configuration of the Adv EQ Gain.

The first page allows selecting a loudspeaker:

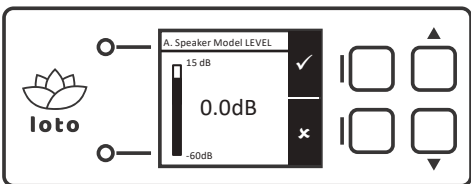


**Note!**

In case of single-speaker preset, the Display skips the Speaker Selection page and shows the Speaker Gain page automatically.

The list of available speakers is coherent with the Speaker Configuration and updates automatically when loading a preset (Applications/Snapshots).

The Speaker Gain setup page is shown here:



The Gain range extend from -60dB to +15dB, with 0.1dB resolution, equivalent to ArmoníaPlus GUI for Adv EQ.

Edit buttons behaviour:

- Single click

A single button click will provide 0.1dB gain adjustments

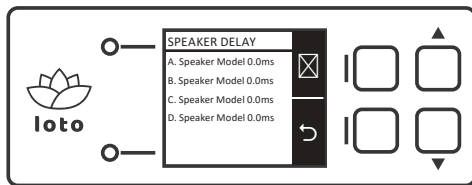
- Long press

Keep pushed for continuous gain adjustment (0.1dB steps then accelerating to 1dB steps)

#### 10 : 4.7. Speaker delay

This menu allows easy configuration of the Adv EQ Delay.

The first page allows selecting a loudspeaker:

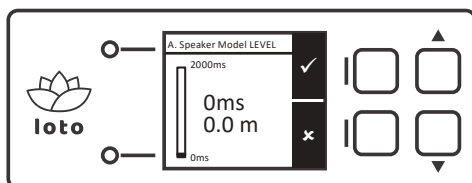


**Note!**

In case of single-speaker preset, the Display skips the Speaker Selection page and shows the Speaker Delay page automatically.

The list of available speakers is coherent with the Speaker Configuration and updates automatically when loading a preset (Applications/Snapshots).

The Speaker Delay setup page is shown here:



The Gain range extend from 0ms to 2sec, with 1ms resolution

Edit buttons behaviour:

- Single click

A single button click will provide 1ms delay adjustments

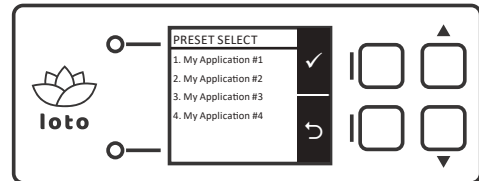
- Long press

Keep pushed for continuous delay adjustment (1ms steps then accelerating to 10ms steps and 100ms steps)

#### 10 : 4.8. Preset select

The PRESET SELECT menu display the list of factory-defined Applications.

The list and order of on-board Applications depends on Memory configuration in ProManagerPlus.

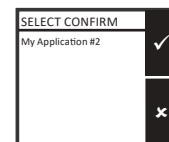


**Note!**

Division per-banks of memory is NOT SHOWN.

The display shows all available Applications in a list.

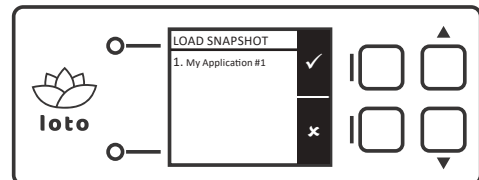
After selecting an Application, the Display shows a confirmation page:



#### 10 : 4.9. Snapshot select

The SNAPSHOT SELECT menu display the list of on-board user-defined Snapshots.

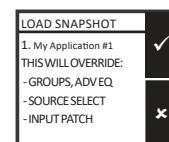
Please refer to User Interaction -> ArmoniaPlus -> Snapshot Save for how to save Snapshots on-board LOTO.



**Note!**

The Display DO NOT show empty slots

After selecting a Snapshot, the Display shows a confirmation page:

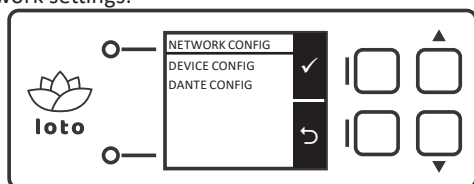


**Note!**

This menu is NOT SHOWN when the end-user memory bank is disabled!

## 10:4.10. Network config

The NETWORK CONFIG menu provides control over LOTO network settings.



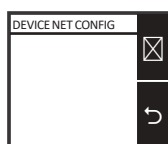
### Note!

DANTE CONFIG not shown for LOTO – Basic

The Display provides dedicated control for both the DSP network interface and Audinate DANTE interface, where:

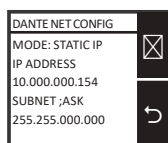
### AUTO IP MODE

Enable the end-user to monitor the DSP/DANTE IP address and Subnet Mask provided by either the DHCP server/Auto IP protocol.



### STATIC IP MODE

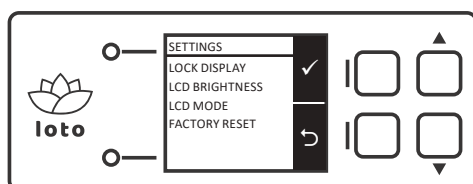
Enable the end-user to customise the DSP/DANTE IP address and Subnet Mask.



### Note!

In STATIC IP mode, the Display prevents the end-user from entering invalid IP addresses!

## 10:4.11. Settings

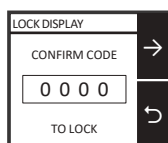


### LOCK DISPLAY

The end-user can lock the Display with a password to prevent access to the loudspeaker settings.

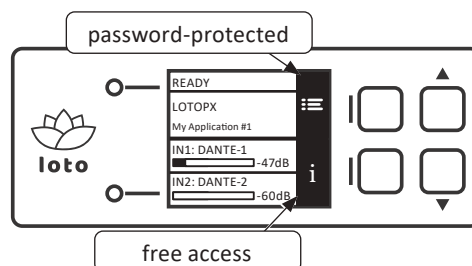
The password should be 4 numbers.

The Display retains the lock-status and password even after a power cycle



To lock the display, the end-user will enter the chosen password twice to prevent miswriting.

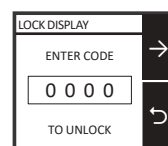
When correctly locked, the Display will show the HOME page:



The NODE INFO pages will remain visible

The MENU button will prompt the UNLOCKING page

To unlock the display, click MENU:

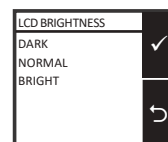


In case the end-user password is lost, the default passcode is: 0123

### LCD BRIGHTNESS

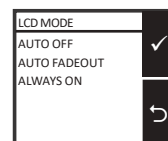
Defines the display backlight intensity.

The display stores the LCD BRIGHTNESS value on-board in non-volatile memory.



### LCD MODE

Defines the display backlight timings.



### AUTO OFF

The backlight will turn off after 1min inactivity (no buttons pressed)

### AUTO FADEOUT

The backlight will dim to minimum after 1min inactivity (no buttons pressed)

### ALWAYS ON

Backlight always ON

The display stores the LCD MODE value on-board in non-volatile memory.

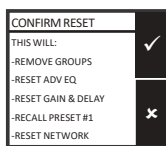


## 10:4.12. Factory reset

The Factory-default reset feature performs:

- ▶ Reload the Factory-default Snapshot
- ▶ Reload Application (Slot) #1
- ▶ Reset Adv EQ
- ▶ Remove Groups
- ▶ Reset DEVICE Network interface to DHCP
- ▶ Reset DANTE Network interface to DHCP (valid for LOTO – Advanced only)
- ▶ Reboot

Before applying the Factory reset, the display prompts the user with a confirmation page:



For “soft” reset via ArmoníaPlus, see User Interaction->ArmoníaPlus Soft reset

## 10:5.ArmoníaPlus

The following paragraphs highlights some user-interaction features for finished loudspeakers based on LOTO – DSP within ArmoniaPlus.

Please refer to ArmoniaPlus documentation and tutorials for detailed software features and usage.

### 10:5.1. Virtual Devices

End-users can design shows offline, adding virtual loudspeakers to the workspace.



### 10:5.2. Match

Click on the “discovery” button, all the devices connected to the network should appear on your screen.

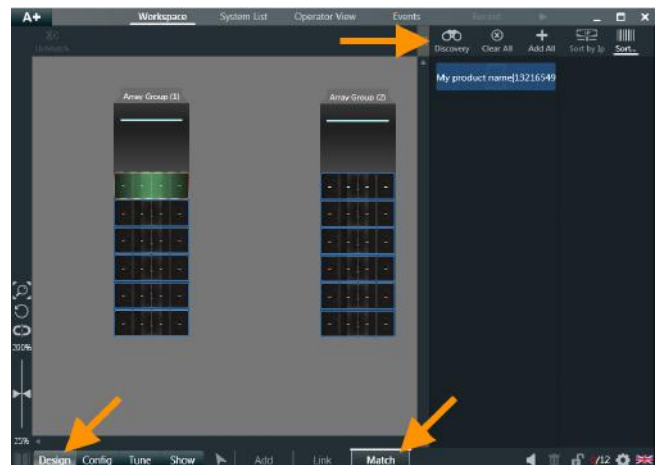
To import devices in the workspace (without linking to virtual counterparts), simply drag&drop the desired loudspeaker or click “Add All”.

To match online devices with their virtual counterpart there are two options:

1) Select the discovered device. The unit will turn yellow in ArmoníaPlus and blink on the front panel. Click on an available virtual unit within your workspace (not compatible models are greyed out). Once the first one is matched, ArmoníaPlus will automatically select the second available amp allowing you to quickly select the next desired virtual amp.

2) Multi-select the devices to be matched on the left side of your screen (please note that a progressive index will be displayed on them) and then physically press the Preset pushbutton on your loudspeaker respecting the index order.

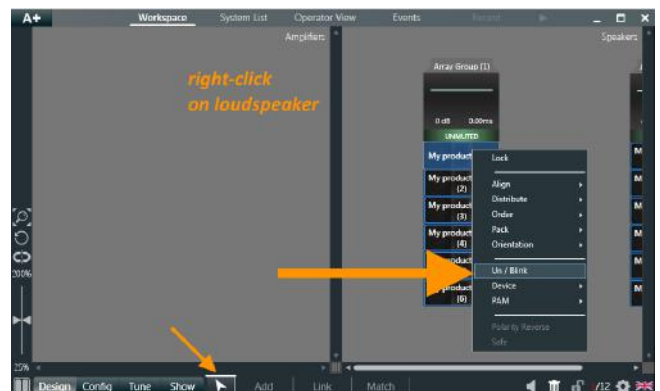
Matched amplifiers will change from displaying a blue border (virtual) to either displaying no border (online) or candy-cane red-white border (syncing). Upon leaving the match screen ArmoníaPlus will prompt you with the desync window to resolve mismatches between the real and virtual counterparts, you will usually need to SEND parameters to all amplifiers to push your design to the devices.



### 10:5.3. Call

Identify online physical devices with CALL.

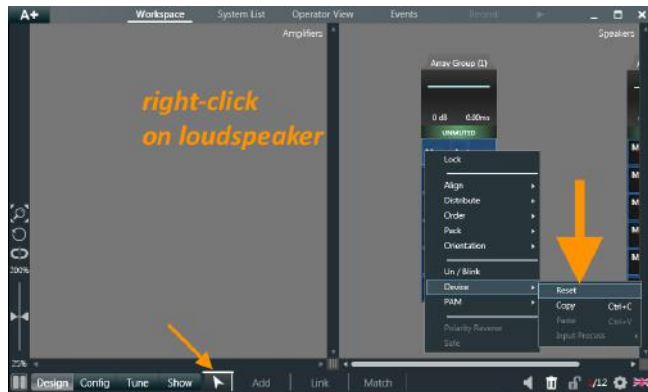
Select Arrow, Right-click on device in Workspace -> Un / Blink to flash LOTO LEDs



### 10:5.4. Soft Reset

Load the default snapshot on a device.

Select Arrow, Right-click on device in Workspace -> Device -> Reset



### 10:5.5. Preset Recall

Recall from local memory:

Select Arrow -> double click on device -> Memory

- Applications,
- load any factory-defined Application

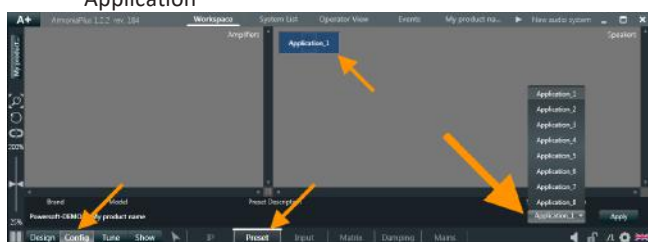


- Snapshots,
- load any user-defined Snapshot (only if the loudspeaker supports Snapshots)



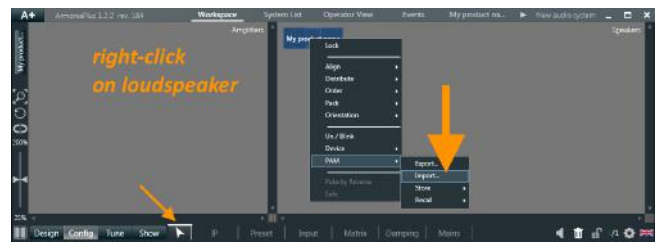
Recall from file:

- Applications
- Select Config -> Preset and load any factory-defined Application



- Snapshots

Select Arrow, Right-click on device in Workspace -> PAM -> Import



### 10:5.6. Snapshot Save

Save current Snapshot in on-board memory:

Select Arrow -> double click on device -> Memory -> Snapshot

Click Save on desired slot

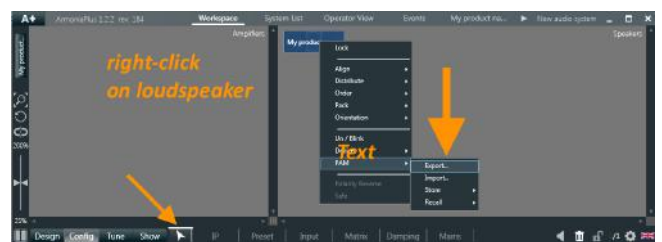
This will store the current DSP status (including Application)



Save current Snapshot on file:

Select Arrow, Right-click on device in Workspace -> PAM -> Export

This will save the current DSP status in a (.pam) file



### 10:5.7. Remote OFF/STANDBY

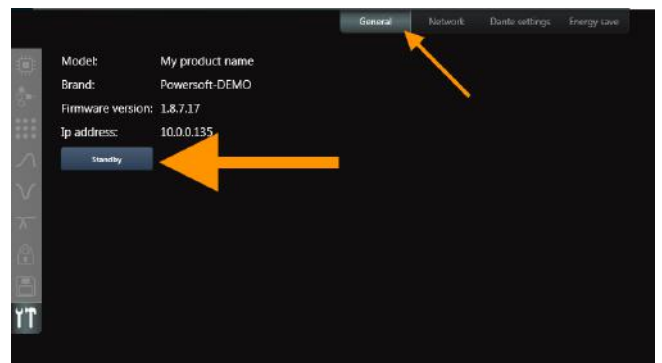
Wake-up or put a DSP to sleep remotely

- In System List



- In DSP details

Select Arrow -> double click on device -> Options -> General -> Standby

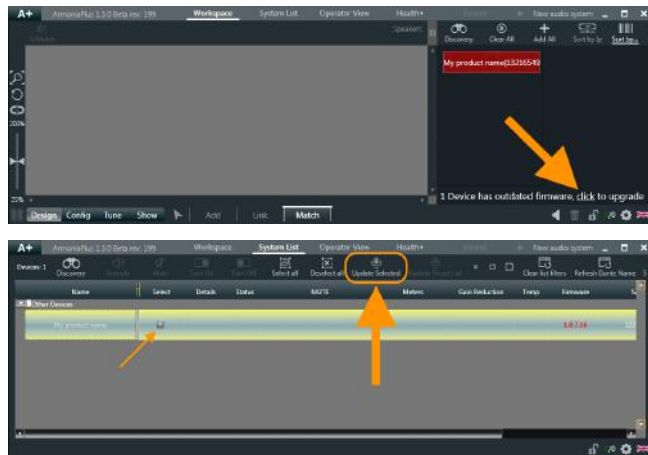


A light blue contour identifies Standby devices in Workspace:



## 10:5.8. Firmware Updater

Update DSP to Powersoft's latest firmware via System List ->  
Update selected



## Dante/AES67

LOTO – Advanced provides audio-over-IP capabilities up to 2IN-2OUT streams, based on UltimoX4 chipset from Audinate, supporting Dante and AES67 protocols.

### 11 : 1.Audinate Chipset

LOTO – Advanced comes with built-in, custom-compiled Audinate firmware, licensed to Powersoft.

Loudspeakers based on LOTO – Advanced are identified within Dante network (Dante Controller) by the following configuration:



**Manufacturer: Powersoft**

**Product Type: LOTO**

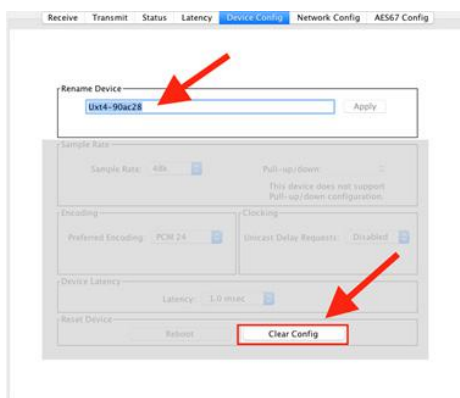
Product/ Software/ Firmware Version:

Powersoft versioning for Audinate chip (due to change without notice)

**Model: UltimoX4**

Dante Firmware/ Hardware / ROM version:

Audinate versioning



**Device Name: Utx4-XXXXXX**

Where XXXXXX= last 6 digits of MAC address

**Note!**

The Device name is user-modifiable via Dante Controller/ ArmoníaPlus

**Note!**

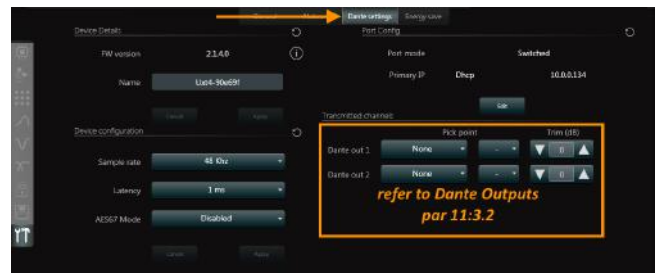
The Device Name resets to “Utx4-XXXXXX” after a “Clear Config” command

### 11 : 2.Dante settings

Audinate chipset is fully configurable via Audinate Dante Controller.

Please refer to Audinate/AES67 documentation and resources for more info on configuration, use, implementation and troubleshooting of Dante/AES67 protocols.

The following image highlights some proprietary Dante controls, also available within ArmoníaPlus GUI:

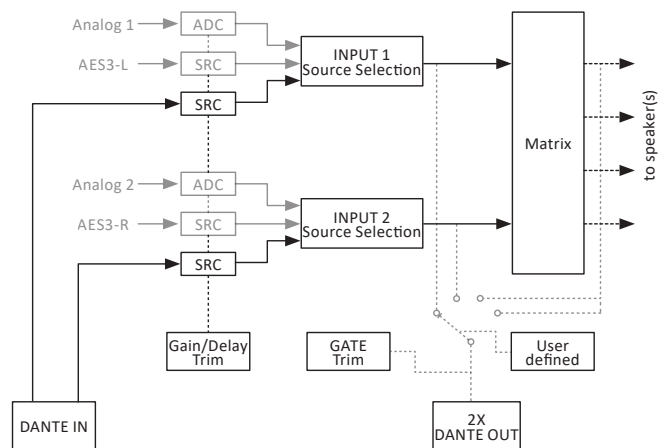


### 11 : 3.Stream injection/pick points

#### Inputs

Dante/AES67 input streams links directly to LOTO input source selection and backup strategy.

- ▶ Dante/AES67 IN1 is wired to LOTO input block 1
- ▶ Dante/AES67 IN2 is wired to LOTO input block 2



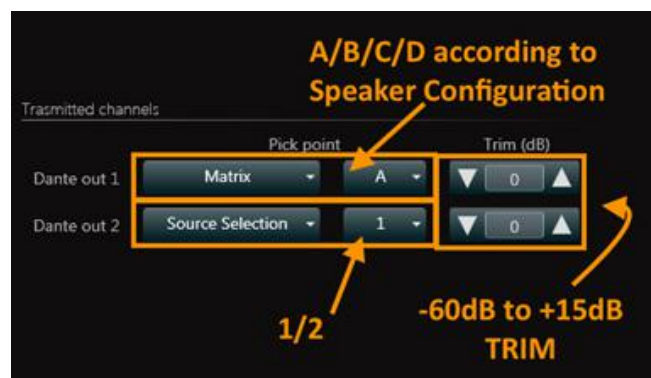
#### Outputs

Dante/AES/67 output streams pick-point is user defined.

Each output can source from:

- ▶ Source selection output (Block 1 or 2)
- ▶ Matrix output (A/B/C/D according to Speaker Configuration)

Using Dante/AES67 outputs, LOTO provides Analog/AES3 to Dante/AES65 conversion when connected to Source Selection, or basic mixing capabilities when connected to Matrix Outputs



## Extra features

### 12 : 1.External LED

LOTO can drive a loudspeaker front-mount LED (RGB, not included).

The front-mount LED can be configured to show different color-coded conditions:

Condition	Priority	Color	Description
ON	1 (LOW)	OFF	Off in normal conditions
		Green	Steady-on with selected color in normal conditions
		Blue	
		White	
Output limit	2	OFF	Output Limit not shown
		Yellow	Yellow when Gain Reduction $\geq 2\text{dB}$ (RMS/Peak/Power/Current limiters on any output)
Input clip	3	OFF	Input Clip not shown
		Red	Red when any input is clipping (analog $\geq 26\text{dBu}$   digital $\geq 0\text{dBFS}$ )
Output clip	3	OFF	Output Clip not shown
		Red	Red when any output is clipping (Clip limiter Gain Reduction $\geq 2\text{dB}$ )(*)
Energy-save	4	OFF	Energy-save not shown
		Blue	Steady-blue with Energy-save is enabled and active
Matching/Blinking	5 (HIGH)	OFF	ArmoníaPlus-Call not shown
		Red	Blinking with selected color when ArmoníaPlus is calling
		Green	
		Blue	
		White	

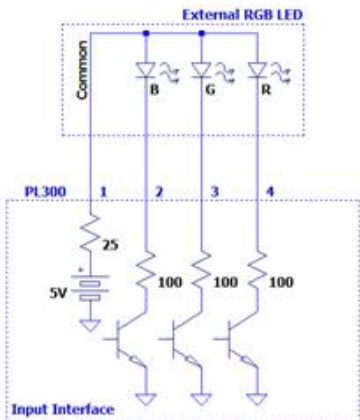
(\*) hardware clip limiter also shown

One condition shown at a time according to priorities.

When in Remote OFF/Standby mode, the External LED is automatically turned OFF.

The LED should be RGB common-anode, but Bi-Colour or Single Colour LEDs could also be used, please contact Powersoft for more info.

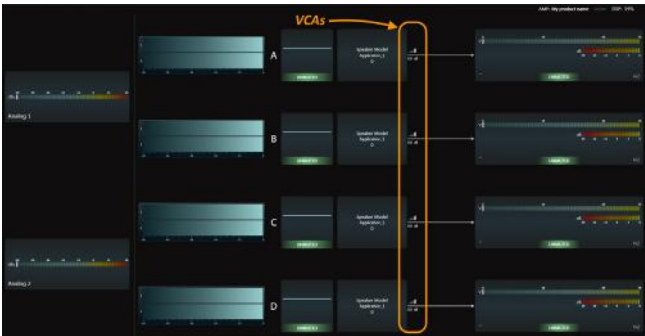
**Driving circuitry:**



### 12 : 2.External volume pots

LOTO with LEDs + Pushbuttons interface supports up to 4x VCA inputs for loudspeaker volume control, according to the Speaker Configuration (potentiometers not included).

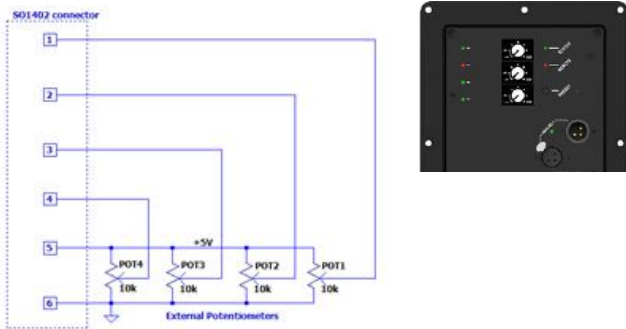
VCA insertion point in DSP processing scheme:



VCAs provides attenuation control from 0dB to about -40dB and the typical application could be loudspeaker volume control through panel-mount potentiometers:

The Volume POTs should be 10kΩ LINEAR.

**Schematics:**



Application example

### 12 : 3.Spare pushbutton

Available on LEDs + Pushbuttons User Interface ONLY!

LOTO includes an auxiliary pushbutton, custom-configurable with the following functions:

Function	Input	Description
OFF	-	-
External LED ON/OFF	Click	Click to toggle the external front-mount LED on/off
Energy-save ON/OFF	Long Press	Press (>2sec) to enable/disable the Energy-save mode
Energy-save + External LED ON/OFF	Click	Click to toggle the external front-mount LED on/off
	Long Press	Press (>2sec) to enable/disable the Energy-save mode



### Note!

Using the Spare pushbutton requires a custom panel cut-out!



### Note!

SPARE pushbutton is inhibited when LOTO IS connected to ArmoniaPlus

## 12 : 4.Line level output

LOTO – DSP can be used to drive line-level outputs instead of amplifier modules.

This capability is limited to DSP outputs 3&4 and requires an external active-buffer stage (not provided, contact us at support.audio@powersoft.com design guidelines).

Line-level outputs sources post-processing and provides dBu-scaled voltage limiters and meters within ArmoniaPlus.

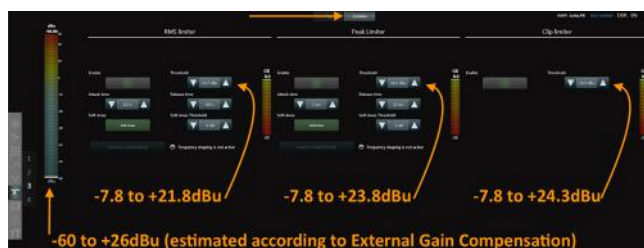
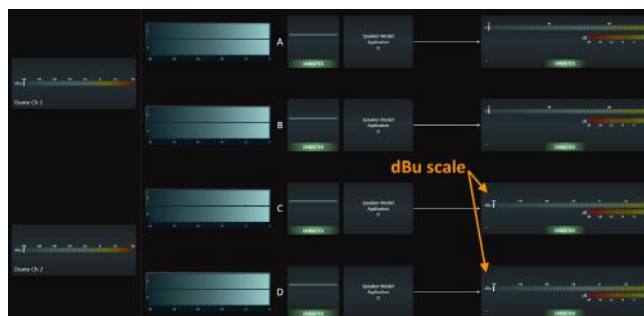
Line-level processed outputs can drive other powered loudspeakers or used as digital-to-analog converters (Dante/AES67/AES3 inputs only available on LOTO-Advanced).

## ArmoníaPlus

Line-level outputs behave exactly as “standard” amplifier outputs within ArmoníaPlus.

Line-level outputs can be joined/named/locked and integrates within Application and Snapshot preset seamlessly.

The main difference in the GUI consist in the metering and limiter, where thresholds are tailored to line-level outputs and defined in dBu:



## Software support for Line-level mode:

### ProManagerPlus

During Prototyping, select 1x Amp connected and any two channels amplifier/configuration:



Set Physical Output 3&4 to “Line-level”:



Enter the hardware gain of your external active-buffer stage.

(The External Gain Compensation ensures the correct gain structure for limiters and meters calculations within LOTO-DSP)



# Prototyping

## 13 : 1. Powersoft Model

The prototyping phase for LOTO-based products starts with Powersoft Model Initialization.

The Powersoft Model Initialization programs the DSP with a basic set of parameters, allowing the loudspeaker manufacturer to evaluate the DSP performances, create preset and test a loudspeaker system before creating a Custom Model.

The Powersoft Model Initialization process starts with defining your product I/O hardware configuration, including:

- ▶ DSP type (Basic/Advanced)
- ▶ User interaction (LEDs/ Display)
- ▶ DSP inputs (AES3 ON/OFF, available for LOTO–Advanced only)
- ▶ DSP outputs
  - ▶ Output Mode (Amplifier/ Line-Level)
  - ▶ Amplifier Model
  - ▶ Amplifier output configuration
  - ▶ System Global Sensitivity
  - ▶ External Gain Compensation (for M-Drive/ Line-Level)

### Note!

Please refer to ProManagerPlus documentation for licensing/ activation instructions

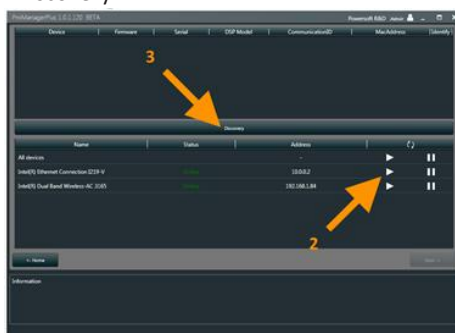
### 13 : 1.1. DSP discovery

Connect LOTO to your network interface (wired).  
Open ProManagerPlus or navigate back to “Home”.

1. Click “DSP\_INITIALIZER”

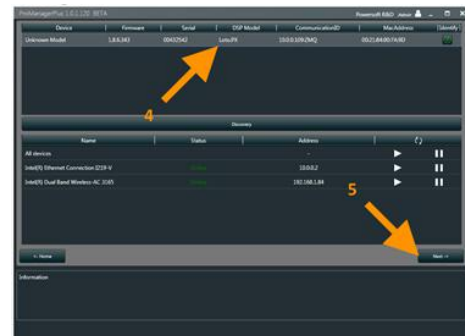


2. Click “Play” to open your network interface
3. Click “Discovery”



Allow few seconds for Discovery to find the device.

4. Click on LOTO row
5. Click “Next”



### Tip!

Use the “Identify” button to recognise a device in a crowded network by blinking the device LEDs

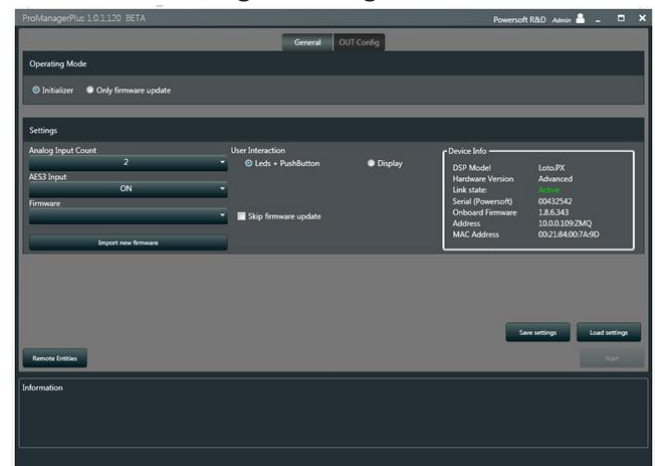
Identifying discovered devices:

**Unknown Model**= identifies brand-new DSPs

**LOTO**= identifies Powersoft Models

**Custom Model DSPs** shows up with Device Name as defined in Custom Model Builder

### 13 : 1.2. DSP configuration - general



- Operating mode

Set to “initializer” by default.

The “Only firmware update” mode provides firmware update capability only.

- Analog Input Count

Define Analog input count for your product (depending on the input interface PCB).

If 1: Analog input 2 discarded in firmware and software interface

If 2: both analog input 1 and 2 included in firmware and software interface

- AES3 Input (for LOTO – Advanced only)

Define if your product should include AES3 input (depending on the input interface).

If OFF: AES3 input discarded in firmware and software interface

If ON: AES3 input fully functional in firmware and software interface.

- Firmware

Perform/skip LOTO firmware update during initialization.

ProManager checks for new firmware during start-up and updating the device firmware is only required if the current on-board version is out of date. See the “Device Info” box for current on-board firmware version.

#### Note!

Skipping the firmware update process (if not required) saves several minutes during initialization.

- User Interaction

Define the user interaction for your prototype according to the interface connected:

#### LEDs + Pushbuttons

Enables DSP control through the LEDs + Pushbuttons interface.

#### Display

Enables basic DSP control through LOTO – Display, for Display evaluation.

Note that full Display features only enables after Custom Model initialization!

#### Note!

Brand-new Display operates only after the first initialization, as they come blank.

Display initializes after DSP reboot and requires several seconds to boot, please wait until the screen goes from full-white to normal operation before turning the device off.

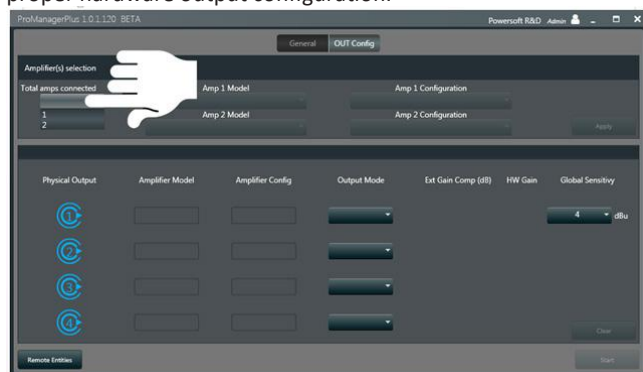
#### Important!

The User Interaction method set during Powersoft Model initialization only applies to the prototype.

The definitive User Interaction mode for a specific loudspeaker product based on LOTO is defined during Custom Model creation.

### 13 : 1.3. DSP configuration - OUT config

The OUT Config page guides you through the selection of the proper hardware output configuration.

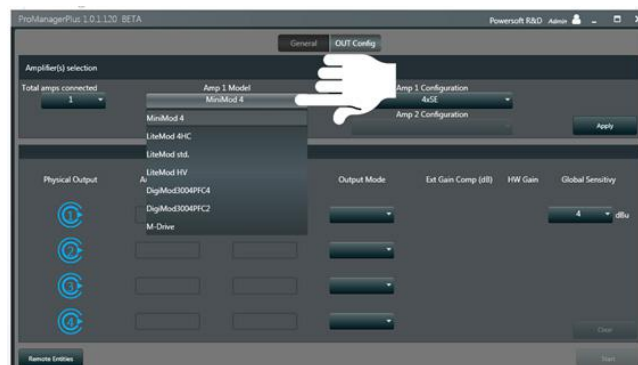


Amplifier(s) selection

- Total amps connected

Define the total amount of amplifier(s) physically connected to LOTO – DSP.

- Amp Model



Select the Amplifier Model connected to LOTO output connector.

The list of compatible Amplifier Models vary depending on “Total amps connected”.

Please see below for a complete list of output configuration-combinations.

#### Important!

Make sure to connect the DSP to the Amplifier(s) according to the tables below.

On the amplifier side, the ribbon cable should connect to CH1&CH2 input IDC. Please refer to the relevant Amplifiers documentation for input connector’s information.

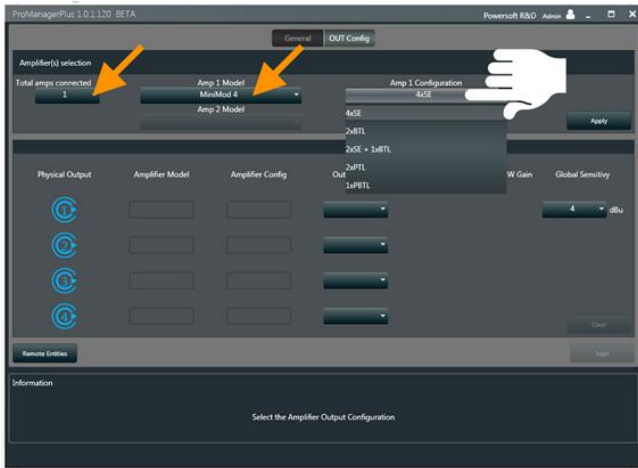
Amps connected	Amplifier Model	Amplifier Configuration	DSP to AMP ribbon cable(s)	CONNECTIONS	
				DSP	AMP
1	MiniMod 4	4 x SE	2 x	PL1100	→ PL1000
		2 x BTL		PL1101	→ PL3000
		2 x SE + 1 x BTL	1 x	PL1100	→ PL1000
		2 x PTL			
		1 x PBTL			
	LiteMod4HC	4 x SE	2 x	PL1100	→ PL1000
		2 x BTL		PL1101	→ PL3000
		2 x SE + 1 x BTL	1 x	PL1100	→ PL1000
		2 x PTL			
		1 x PBTL			
2	LiteMod std.	any	1 x	PL1100	→ PL1001
	LiteMod HV	any	1 x	PL1100	→ PL1001
	DigiMod3004PFC4	any	2 x	PL1100	→ PL1003
				PL1101	→ PL3003
	DigiMod3004PFC2	any	1 x	PL1100	→ PL21
	M Drive	1 x SE	1 x	PL1100	→ PL21
	any		1 x each amp	(*)	

(\*) with two amps connected, the DSP to AMP connections should respect the following standard:

PL1100 on DSP to AMP1

PL1101 on DSP to AMP2

- Amp Configuration



Select the Amplifier Output Configuration for the selected Amplifier Model.

The list of Amplifier Configurations vary depending on Selected Model and “Total amps connected”.

Please see below for a complete list of output configuration-combinations.

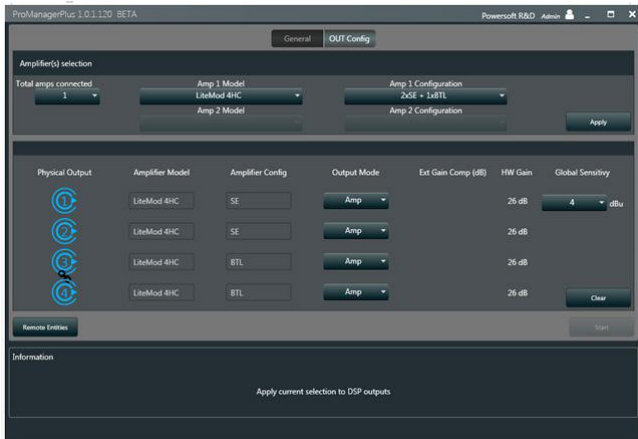
### Important!

Refer to Amplifiers documentation for power output wirings!

**Danger!**

Always turn OFF the amplifier(s) when modifying the power output wirings!

Applying the Amplifier(s) selection:



Click "Apply" to confirm the current Amp Model(s) and Configuration.

The lower section of this page provides the graphical representation of the applied configuration, left to right:

- Physical Output

Display the DSP physical output configuration for SE(PTL)/BTL(PBTL) channels, similar to Speaker Configuration in ArmoníaPlus.

Single Ended/ Parallel=



Bridged/ Parallel-Bridge=



- Amplifier Model

Display the selected amplifier model

- Amplifier Config

Display the current power output configuration for the selected amplifier model

- Output Mode

Display/Select the DSP output mode (Amp/ Line-Level/ OFF), where:

Amp= automatically set by ProManager according to Amplifier(s) Selection.

OFF= both the firmware and the software interface will discard unused DSP channels

Line-Level= configures LOTO – DSP for Line-Level output

- Ext Gain Comp

Define the External Gain Compensation value for M-Drive/  
Line-Level outputs, where:



## M-Drive

Enter the gain-fader value within M-Drive DSP (default is +6dB)

LOTO – DSP use the “Ext Gain Comp” value to provide accurate limiter thresholds for M-Drive

### Line-Level

Please refer to 12:4

- HW Gain

Display the Hardware Gain of the selected Amplifier (when in Amp Mode)

- Global Sensitivity

The Global Sensitivity defines the (nominal) analog input level for reaching the connected amplifier(s) maximum output, by setting the DSP I/O gain.

The DSP also compensates for any sensitivity mismatch when two amplifiers are connected (different models with different nominal sensitivity).

### Note!

The entire loudspeaker-system sensitivity will depend on the preset (gain/EQ/limiters)

### Note!

By definition, BTL channels have higher sensitivity (+6dB) respect to Global Sensitivity.

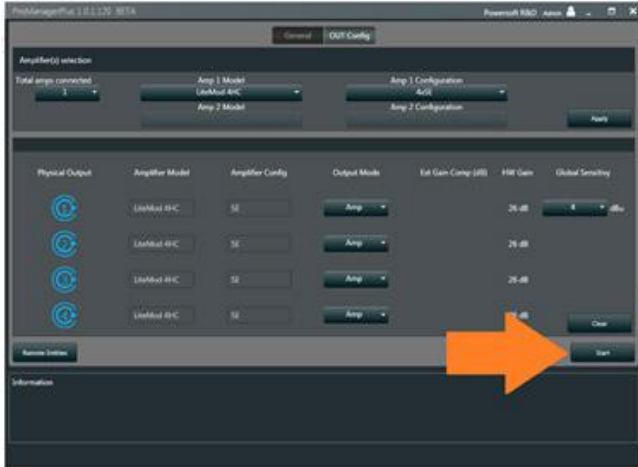
Global Sensitivity only applies to “Amp Mode” channels only.

### 13:1.4. DSP initialization

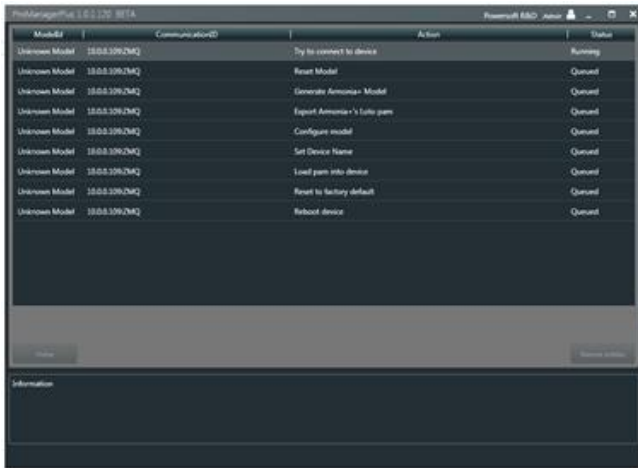
Press “Start” to initialise the DSP:

#### Note!

The “Start” button enables as soon as both “General” and “OUT Config” tabs are correctly configured.

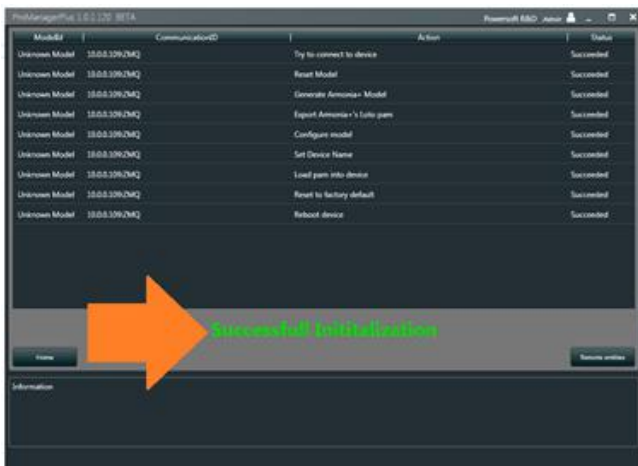


Wait until the initialization process complete



#### Important!

ProManager DO NOT wait for the DSP-reboot to complete!  
DO NOT power-off LOTO before the reboot completes!



Output configuration-combinations for 1x Amplifier Connected:

Amp 1 Model	Amp 1 Config	OUTPUT MODE			
		Way 1	Way 2	Way 3	Way 4
MiniMod4	4xSE	SE	SE	SE	SE
	2xBTL	BTL		BTL	
	2xSE + 1xBTL	SE	SE	BTL	
	2xPTL	PTL	PTL	(*)	
	1xPBTL	PBTL		(*)	
LiteMod4HC	4xSE	SE	SE	SE	SE
	2xBTL	BTL		BTL	
	2xSE + 1xBTL	SE	SE	BTL	
	2xPTL	PTL	PTL	(*)	
	1xPBTL	PBTL		(*)	
LiteMod std.	2xSE	SE	SE	(*)	
	1xBTL	BTL		(*)	
LiteMod HV	2xSE	SE	SE	(*)	
	1xBTL	BTL		(*)	
DigiMod3004PFC4	4xSE	SE	SE	SE	SE
	2xBTL	BTL		BTL	
	2xSE + 1xBTL	SE	SE	BTL	
DigiMod3004PFC2	2xSE	SE	SE	(*)	
	1xBTL	BTL		(*)	
M-Drive	1xSE	SE	/	(*)	

(\*) Unused DSP output channels can be either OFF (discarded by both firmware and software interface) or Line-Level outputs

Output configuration-combinations for 2x Amplifiers Connected:

Amp 1 Model	Amp 1 Config	OUTPUT MODE			
		Way 1	Way 2	Way 3	Way 4
MiniMod4	2xPTL	PTL	PTL		
	1xPBTL	PBTL			
LiteMod4HC	2xPTL	PTL	PTL		
	1xPBTL	PBTL			
LiteMod STD	2xSE	SE	SE		
	1xBTL	BTL			
LiteMod HV	2xSE	SE	SE		
	1xBTL	BTL			
DigiMod3004PFC2	2xSE	SE	SE		
	1xBTL	BTL			
M-Drive	1xSE	SE	/		

Amp 2 Model	Amp 2 Config	OUTPUT MODE			
		Way 1	Way 2	Way 3	Way 4
MiniMod4	2xPTL			PTL	PTL
	1xPBTL			PBTL	
LiteMod4HC	2xPTL			PTL	PTL
	1xPBTL			PBTL	
LiteMod STD	2xSE			SE	SE
	1xBTL			BTL	
LiteMod HV	2xSE			SE	SE
	1xBTL			BTL	
DigiMod3004PFC2	2xSE			SE	SE
	1xBTL			BTL	
M-Drive	1xSE			SE	/



## 13:2.Preset making

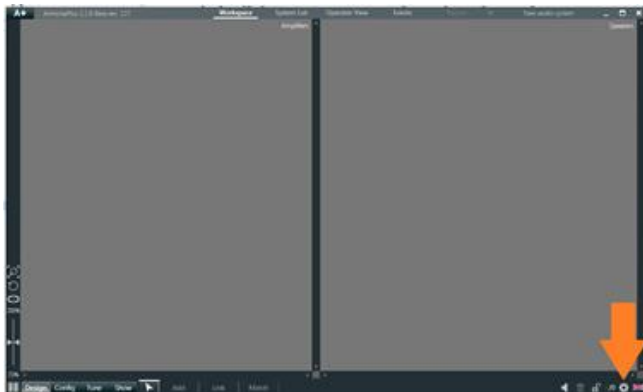
The second step in prototyping with LOTO consist of evaluating the DSP processing and making Powered Speaker Preset (Applications) for your loudspeaker.

### 13:2.1. DSP Discovery

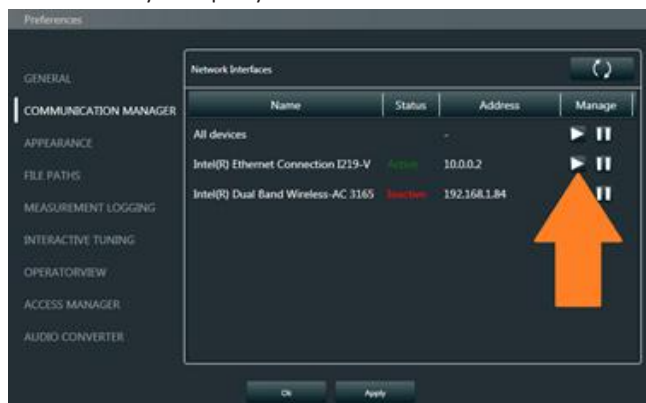
Connect LOTO to your network interface (wired).

Open ArmoníaPlus

#### 1. Open ArmoníaPlus Options

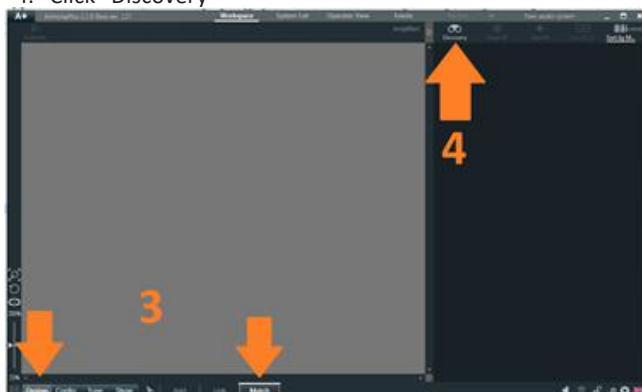


#### 2. Click “Play” to open you network interface

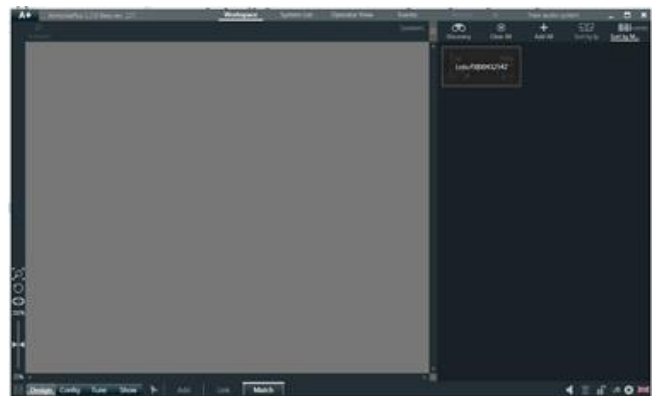


#### 3. Go to Design-> Match

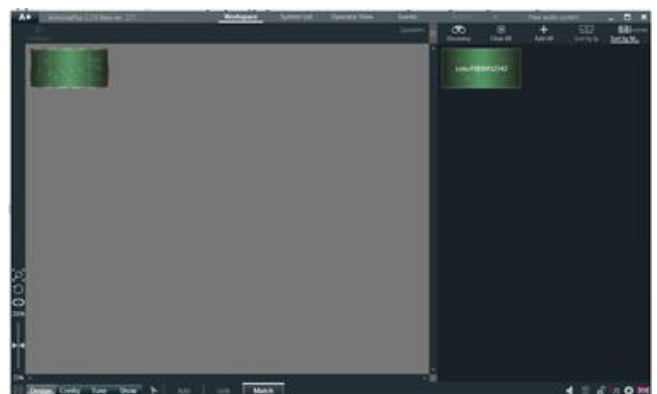
#### 4. Click “Discovery”



Allow few seconds for Discovery to find the device.



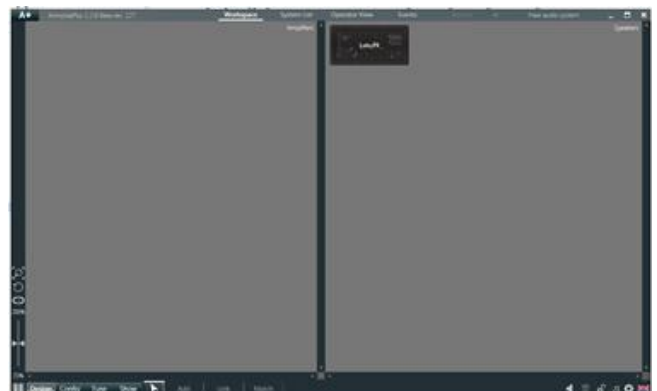
#### 5. Click “Add All” or Drag&Drop LOTO into the Workspace



Allow few seconds for ArmoníaPlus to Sync with the DSP



#### 6. Click the “Arrow” button



#### 7. Double click on LOTO to open the DSP details page



### 13 : 2.2. Speaker configuration

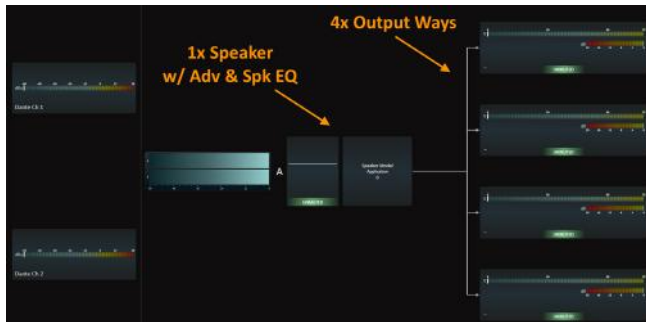
The four outputs in LOTO – DSP can be arranged to drive:

- ▶ multi-way loudspeakers (up to four ways)
- ▶ individual loudspeakers (up to four)
- ▶ combinations of individual and multi-way loudspeakers

This flexibility allow to cover a wide range of typical applications, such as line array/point source and subwoofer boxes as well as 2.1/1.1 systems or special projects.

In LOTO, multi-way loudspeaker shares the same Matrix Output, Adv EQ and Spk EQ, while individual speakers will have independent Matrix Input, Adv and Spk EQ.

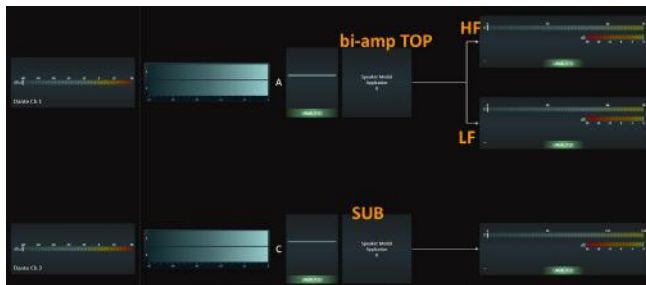
Typical example of a four Way loudspeaker system:



Typical example of a 2.1 loudspeaker system:

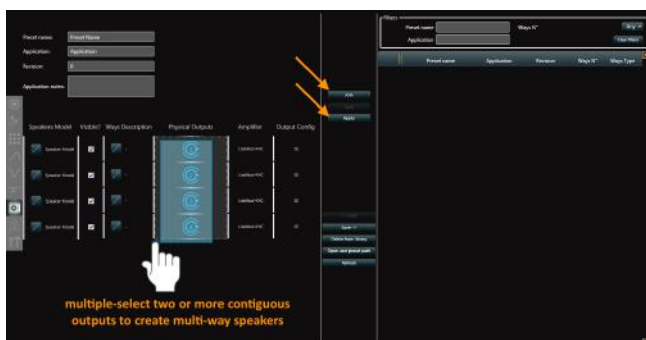


Typical example of a 1.1 loudspeaker system (bi-amp TOP)

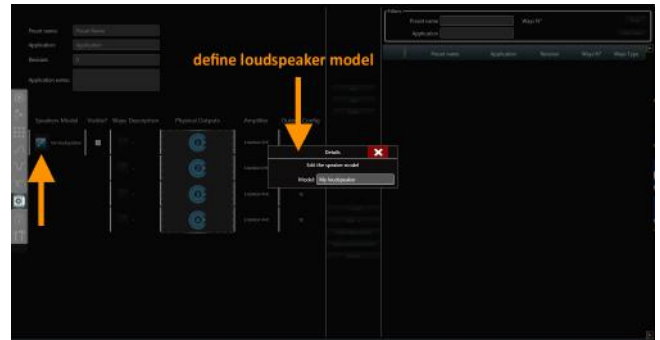


#### Creating multi-way loudspeakers

Access Speaker Configuration and join up to four physical outputs to create multi-way loudspeakers:



#### Define speaker details



#### Naming ways



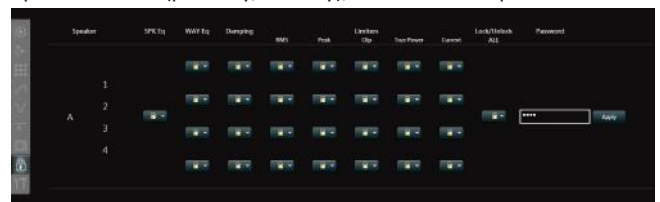
### 13 : 2.3. Defining DSP processing

This includes defining the following blocks according to your loudspeaker design and target response:

- ▶ Speaker EQ
- ▶ Ways blocks
  - ▶ EQ
  - ▶ Limiters
  - ▶ Damping
  - ▶ Live Impedance
  - ▶ Diagnostics

### 13 : 2.4. Locking a preset

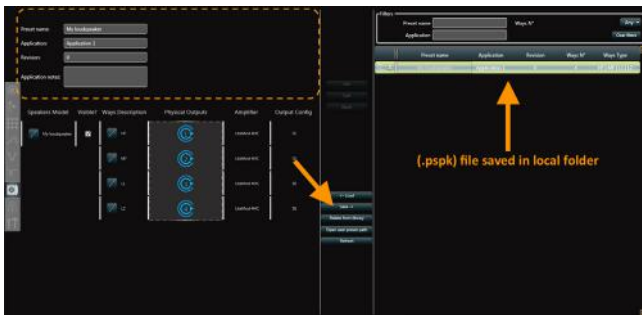
ArmoníaPlus provides the capability of locking a Powered Speaker Preset (partially/entirely), with a custom password:



We strongly recommend locking Applications (entirely) to protect your know-how and prevent any misuse/ modification by end-users.

### 13:2.5. Saving a preset

#### Defining PSPK-file DATA



PSPK-file DATA description:

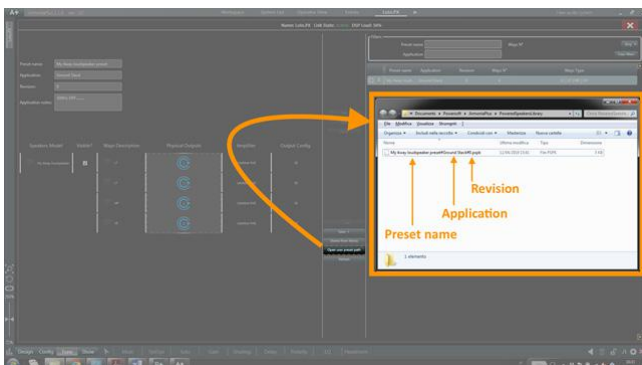
- ▶ **Preset name**  
Defines preset filename for best local-library navigation
- ▶ **Application**  
Defines preset Application for best end-user memory navigation  
Shown in:
  - ▶ ArmoníaPlus-> Design-> Add Powered Speaker
  - ▶ ArmoníaPlus-> Config-> Preset
  - ▶ Display-> PRESET SELECT
- ▶ **Revision**  
Allows creating updated versions of the same Application ensuring best local-library navigation
- ▶ **Application notes**  
Define a unique description for a specific Application.  
Only shown in:
  - ▶ ArmoníaPlus-> Design-> Add Powered Speaker

#### Note!

Local-library files, naming-convention.

For best navigation of the local-library of PSPK files, the following naming convention applies:

**Preset name#Application#Revision.pspk**



### 13:2.6. Validating a preset

The validation of a preset for a specific loudspeaker includes life-cycle/stress/reliability testing.

We strongly suggest carrying out the reliability test for a loudspeaker during the prototyping phase, being able to correct limiters and loudspeaker response before moving to Custom Model creation and production phase.

### 13:2.7. Advanced features

LOTO speaker configuration allows to HIDE loudspeakers to the end-users.

The main applications of this feature are:

- ▶ Hiding unused output ways
- ▶ Removing Adv EQ/Grouping capability

#### Note!

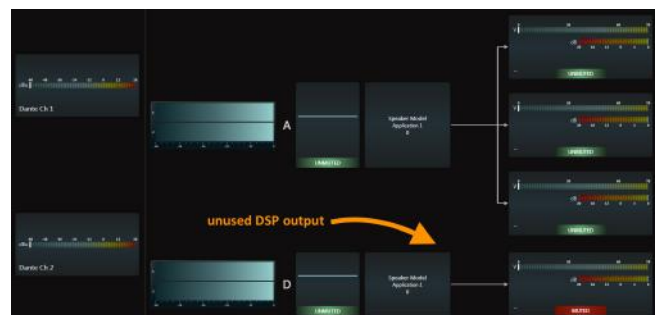
The speaker-visibility feature do not substitute preset-locking for “visible” speaker preset security.

Refer to Preset-locking for learning how to protect “visible” speaker preset.

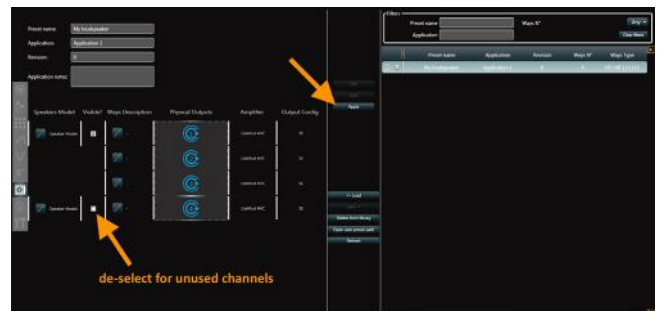
#### Hiding unused output ways

This feature allows hiding unused output ways within products where not all the DSP/Amplifier outputs are used.

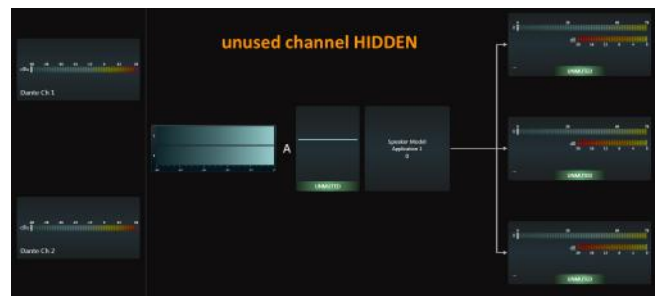
Typical example of a 3way loudspeaker based on a 4ch amplifier (1x unused DSP/Amplifier channel):



“Visibility” option available in Speaker Configuration (per Speaker)

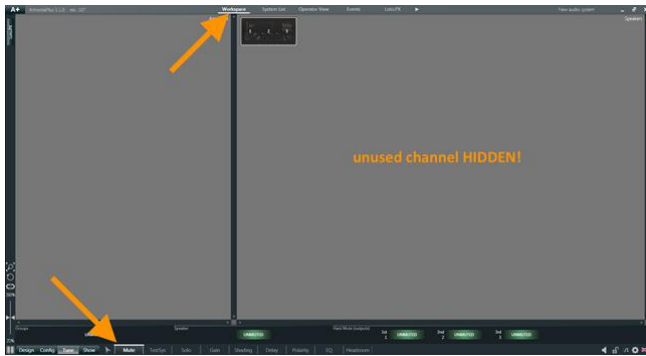


End result (DSP scheme):

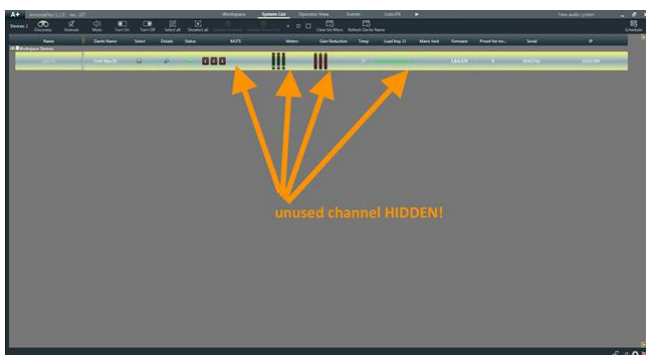




End result (workspace):



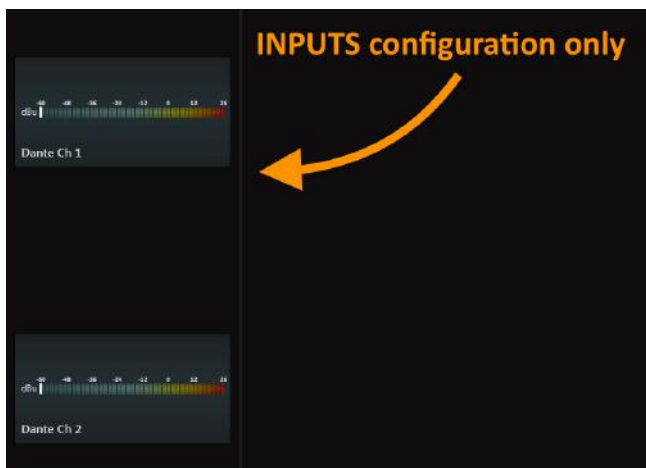
End result (System list):



### Removing Adv EQ/Grouping capability

The speaker-visibility feature allows for special product applications with basic remote-monitor capabilities only.

Hiding all speakers in a preset means limiting the end-user control of a product to the input settings only (backup strategy, input Gain/Delay trim):



Hiding all speakers also virtually “lock” the Advanced EQ, providing the option to use the Advanced EQ as part of the Speaker EQ, since the end-user will never be able to see/modify it.

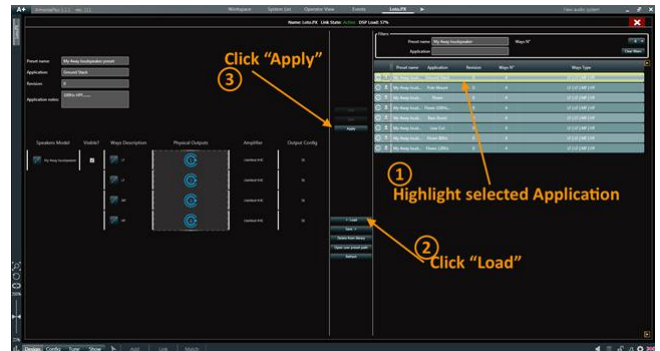
## 13 : 2.8. Factory default snapshot

The following steps highlight the procedure for exporting the Factory-default Snapshot.

### 1. Loading Application

The factory-default snapshot must contain also an Application to fill memory slot n°1.

In order to load the selected application, open Speaker Configuration on your prototype:



### 2. Define Factory-default configuration

Set of parameters that the DSP will apply after a factory-reset command.

This includes:

#### Source Selection

Define Backup Strategy and Input Priority according to the typical/most comprehensive application of your product (i.e. enabling the Backup Strategy and forcing the Input Priority to Dante->AES3->Analog allows for any input after a Factory-reset without any additional configuration. This is a safe option for use cases where ArmoniaPlus might not be available on the fly)

Define “Amp Global Settings” (input Gain/Delay trim) (i.e. reset Gain/Delay trim for nominal loudspeaker sensitivity/latency according to your own loudspeaker datasheet)

#### Matrix

Define standard matrix sends for a specific loudspeaker use-case

(i.e. in a 2.1 system you might want to force MONO MIX on SUB and L/R routing to TOPs)

#### Adv EQ

Usually flat, but could also be used to apply a custom EQ curve for end-users reference

#### Options

*General-> Standby*

Not used. Standby feature automatically disabled during Factory-reset

*Network config-> Mode*

Not used. Network Mode automatically set to DHCP during Factory-reset

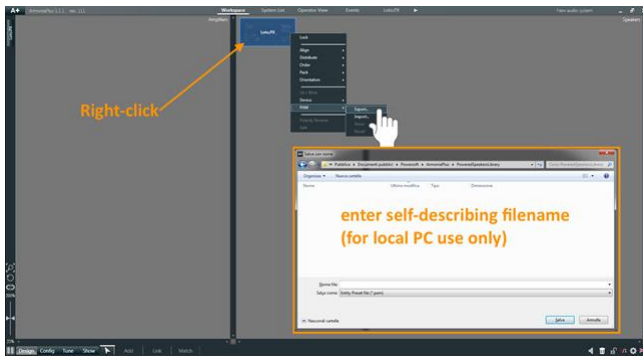
*Dante settings*

Define standard configuration for Dante outputs

*Energy-save*

Define standard configuration for Energy-save

### 3. Export Factory-default Snapshot



#### Note!

The Factory-default Snapshot filename is only used within your local PC.

The end-user will only see the name of the Application contained within (on Display/ArmoníaPlus).

## 13 : 3. Custom Models

The third step in prototyping consist of compiling Custom Models with the entire set of data, preset and settings for your finished product.

Custom Models will allow LOTO – DSP initialization with just few clicks during Production.

Every LOTO – based product requires a dedicated Custom Model, containing:

- ▶ Unique Product Name
- ▶ Product Description
- ▶ Product Family
- ▶ Product Image
- ▶ Hardware configuration
- ▶ Preset
- ▶ Miscellaneous settings

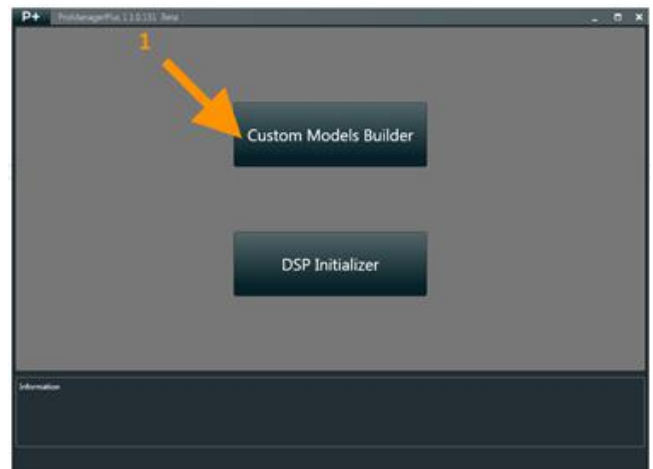
Find below the guided procedure for Custom Models creation.

### 13 : 3.1. Creating new model

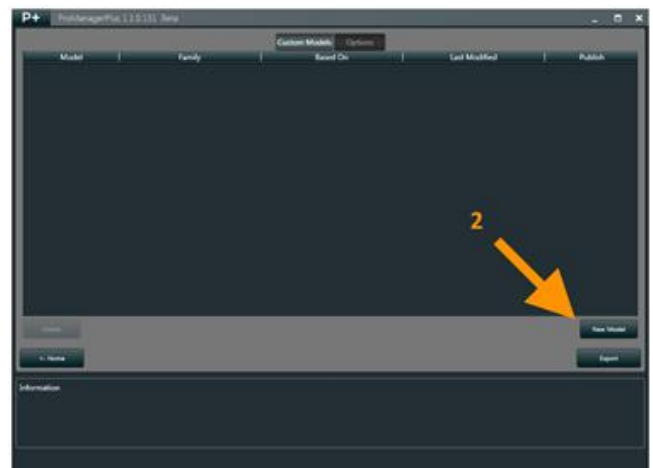
Creating Custom Models is an “offline” procedure performed via ProManagerPlus.

Open ProManagerPlus or navigate back to “Home”.

1. Click “Custom Model Builder”



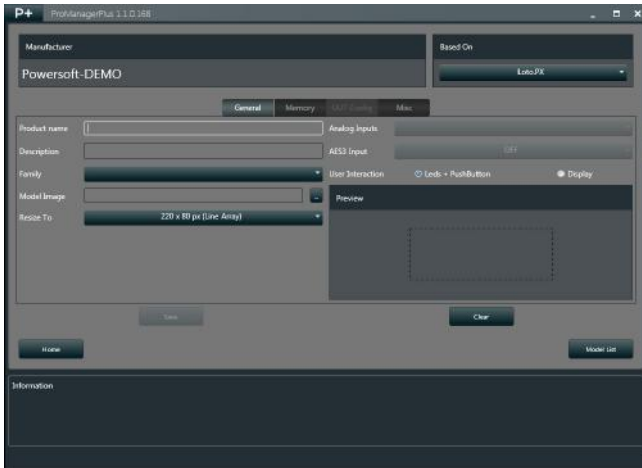
2. Click “New Model”



3. Click “Based On”



### 13:3.2. Custom model - general



- ▶ Product name

Defines the loudspeaker name (shown in ArmoníaPlus/Display)

- ▶ Description

Defines the loudspeaker description (shown in ArmoníaPlus)

- ▶ Family

Defines the Family of loudspeakers that the model belongs to (shown in ArmoníaPlus).

Select an existing family or enter a new one

- ▶ Model Image

Import the loudspeaker image (shown in ArmoníaPlus)

- ▶ Resize to

Defines the resizing of the loudspeaker image to comply with ArmoníaPlus standard icons.

For best resolution use bigger images (N times bigger than the selected resize option to keep your aspect ratio)

- ▶ User Interaction

Defines the user interaction type for you loudspeaker.

(Selecting “Display”, ProManager will show the dedicated page for Display configuration)

- ▶ Analog Inputs

Defines the number of analog inputs for your loudspeaker.

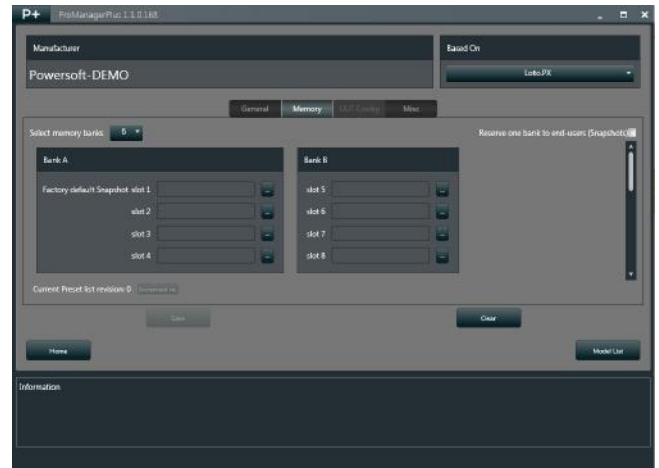
Non-modifiable, sources from Factory-default Snapshot

- ▶ AES3 Input

Defines if the loudspeaker should include AES3 inputs or not (LOTO – Advanced only).

Non-modifiable, sources from Factory-default Snapshot

### 13:3.3. Custom model - memory



- ▶ Select memory banks

Defines the number of active banks (4x slots each) for a specific loudspeaker

Reserve one bank to end-users

Defines whether the loudspeaker should include a memory bank dedicated to the end-user

- ▶ Factory default Snapshot (slot 1)

Load the Factory-default Snapshot (.pam) for your loudspeaker

- ▶ Applications (slot 2,3,4.....)

Factory-defined Applications.

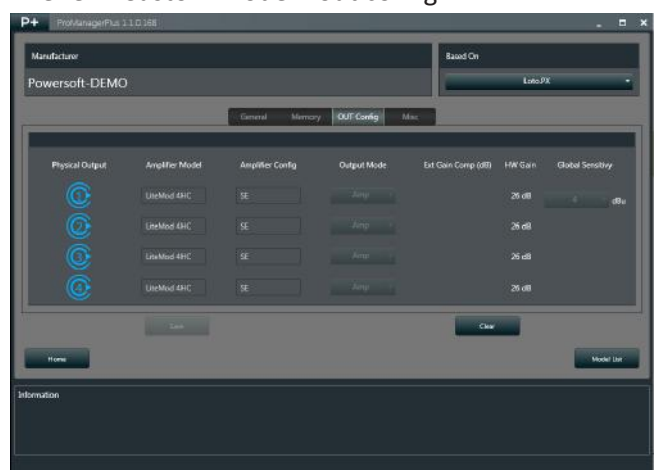
Load as many Application files (.pspk) to fill the entire active banks (active banks defined by “Select memory banks”)

#### Applications vs Factory-default Snapshot compatibility

The Factory-default Snapshot defines the hardware combination for a certain Custom Model (DSP type, inputs configuration, output configuration).

A Custom Model will allow for any Application, provided the Ways N° is the same as in the factory-default snapshot.

### 13:3.4. Custom model - out config



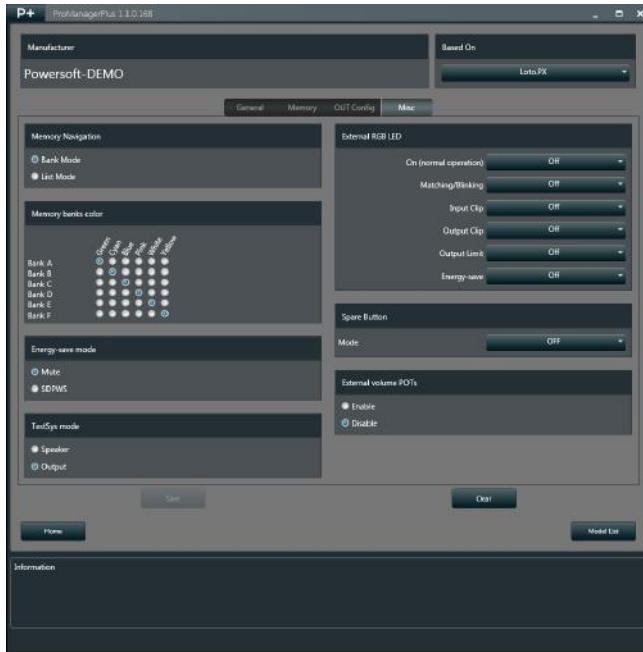
The OUT Config page displays the DSP + Amplifier output configuration.

The DSP output configuration is sourced from the Factory-default Snapshot and read-only.

#### Note!

To create a Model with a different output configuration, please refer to Prototyping – Powersoft Model

### 13:3.5. Custom model - misc



- ▶ Memory Navigation (LEDs User-Interface only)

Defines the Preset Button behaviour for LEDs + Pushbuttons User interface

- ▶ Memory banks colour (LEDs User-Interface only)

Define the LED colour for all active preset banks

- ▶ Energy-save mode

Define the Energy-save mode for your loudspeaker.

Two options are provided, according to the connected amplifier compatibility:

- Mute

when the DSP enters Energy-save, the amplifier(s) PWM carrier is switched off.

This allows short wake-up times but higher consumption during Energy-save

- SDPWS

when the DSP enters Energy-save, the amplifier(s) Main Power Supply is switched off.

This allows very low power consumption during Energy-save but longer wake-up time

- ▶ TestSys mode

Defines the loudspeaker functionality when used in TestSys mode within ArmoníaPlus.

The TestSys-Mode in ArmoníaPlus is a special feature dedicated to system testing, based on LOTO internal pink noise generator.

Two options are available:

- Speaker

Armonía will show 1x Generator Mute/Unmute button for each speaker

- Output

Armonía will show 1x Generator Mute/Unmute button for each loudspeaker output way

- ▶ External RGB LED

Defines the behaviour and colour for the loudspeaker front-mount LED

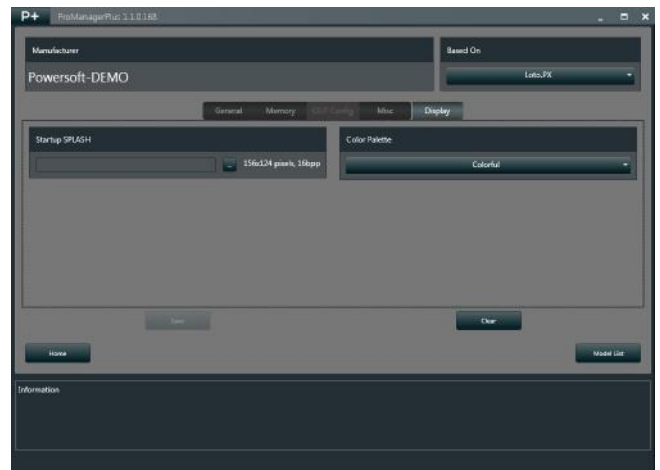
- ▶ Spare Button (LEDs User-Interface only)

Defines the behaviour of the Spare Pushbutton

- ▶ External volume POTs (LEDs User-Interface only)

Define if your loudspeaker includes external volume potentiometers (VCAs) or not

### 13:3.6. Custom model - display



- ▶ Startup SPLASH

Define the custom startup Splash for LOTO – Display

- ▶ Colour Palette

Define the Display colour theme

### 13:3.7. Prototype validation

Validating a loudspeaker prototype consist of initializing LOTO as Custom Model and making sure the entire configuration and settings comply with the expected result, such as:

- ▶ DSP configuration and settings

- ▶ Memory content

- ▶ Armonía model recognition

- ▶ Armonía model info and image

- ▶ Display configuration

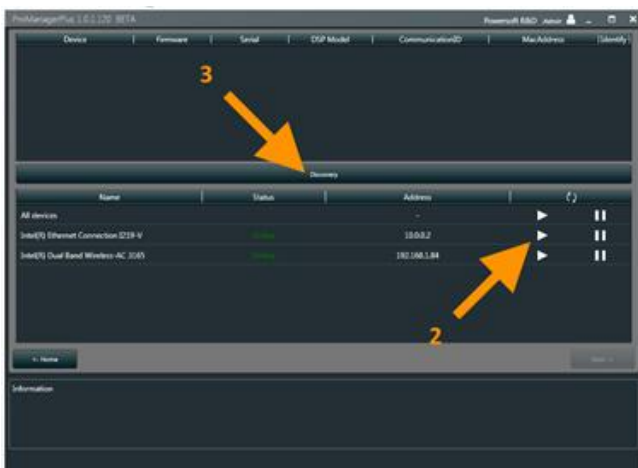
### 13:3.8. Custom Model Initialization

Connect LOTO to your network interface (wired).  
Open ProManagerPlus or navigate back to "Home".

1. Click "DSP\_INITIALIZER"

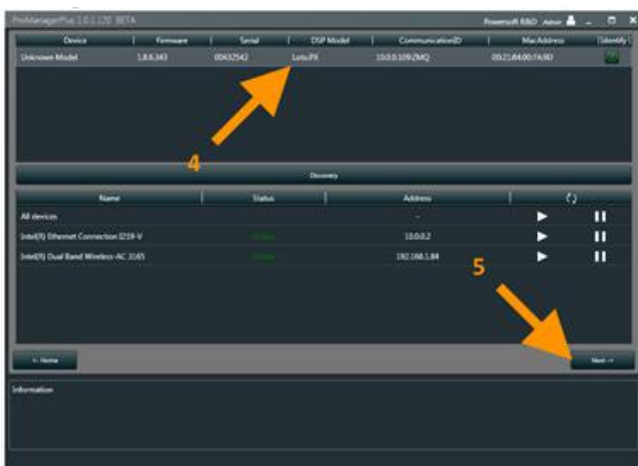


2. Click "Play" to open your network interface
3. Click "Discovery"



Allow few seconds for Discovery to find the device.

4. Click on LOTO row
5. Click "Next"



Identifying discovered devices:

**Unknown Model**= identifies a brand-new DSPs

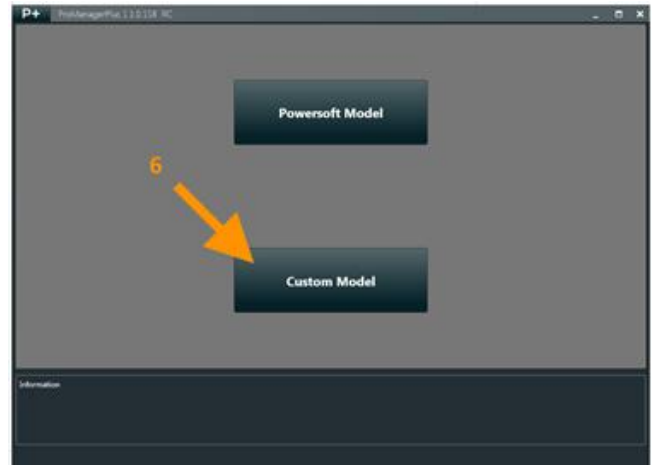
**LOTO**= identifies Powersoft Models

**Custom Model DSPs** shows up with Device Name as define in Custom Model Builder

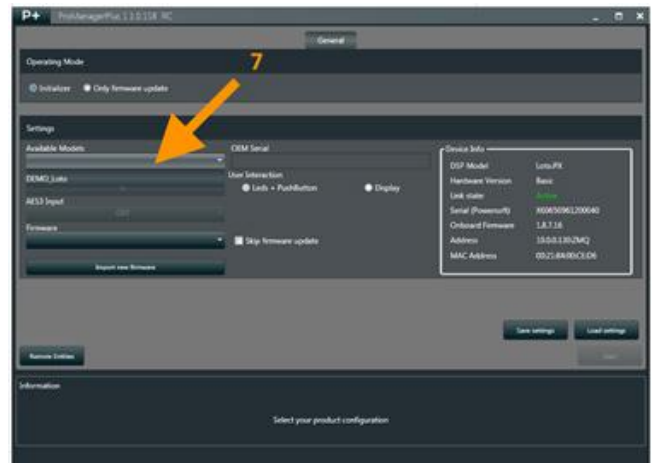
*Tip!*

Use the "Identify" button to recognise a device in a crowded network by blinking the device LEDs

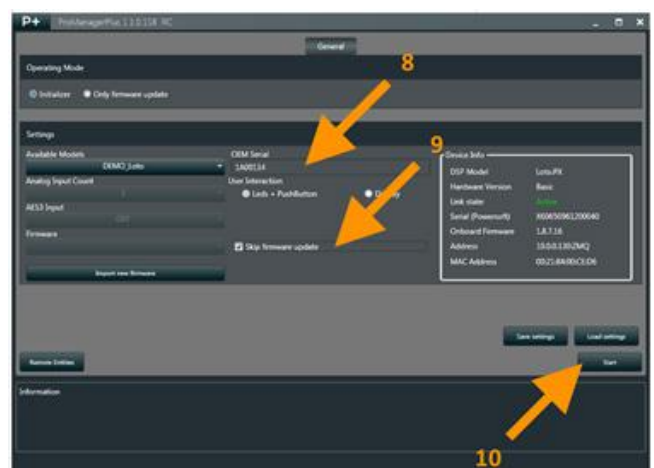
6. Click "Custom Model"



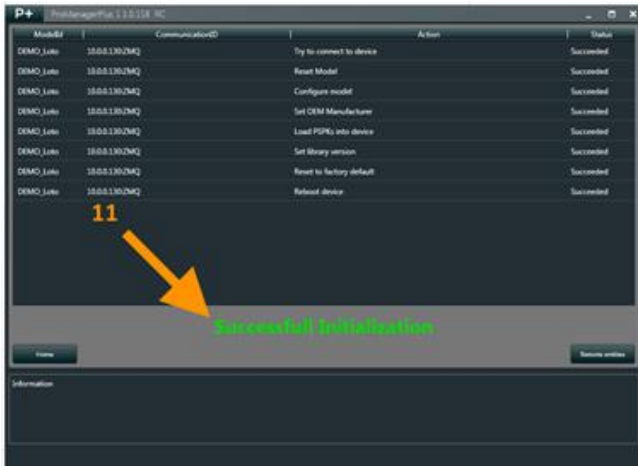
7. Select desired Model



8. Enter Serial Number for your Prototype
9. Skip firmware (or update to latest if new fw is available)
10. Click "Start"



## 11. Wait until completed



Important!

ProManager DO NOT wait for the DSP-reboot to complete!

DO NOT power-off LOTO before the reboot completes!

## 13:3.9. Private Publish

The private publish feature in ProManager and ArmoniaPlus allows to install your model prototype within your ArmoniaPlus copy for testing and validation, before publicly releasing your finished loudspeaker

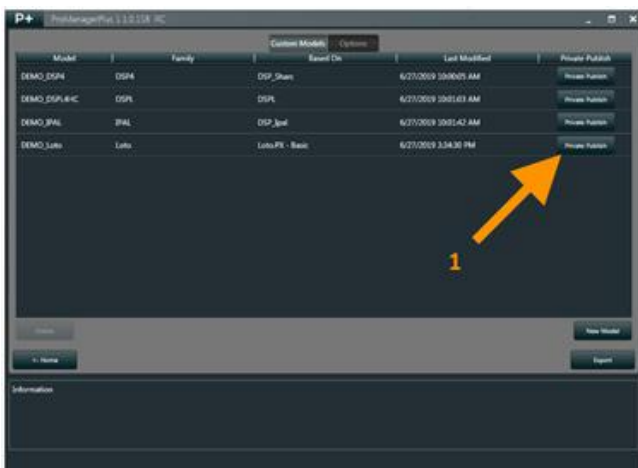
### 13:3.9.1. Marketplace procedure (online)

This method requires an internet connection.

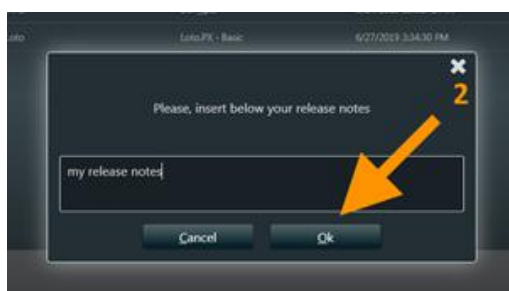
Open ProManagerPlus or navigate back to "Home".

Open Custom Model Builder

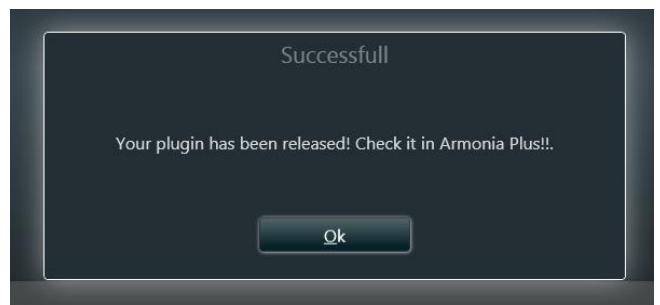
#### 1. Click "Private Publish"



#### 2. Insert your release notes and press "Ok"

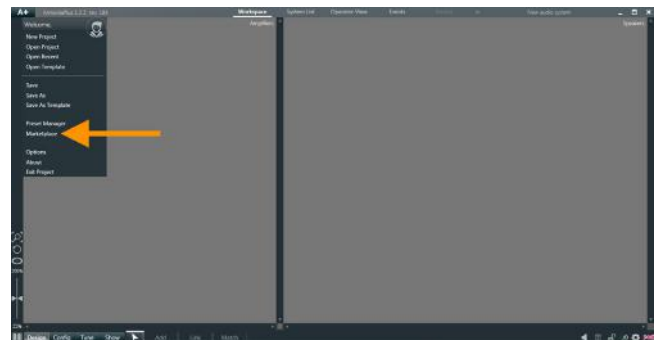


## 3. Wait for Powersoft server confirmation

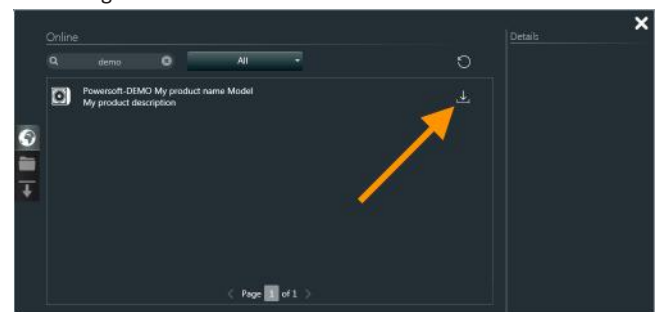


Open ArmoniaPlus (v1.2.0 or above)

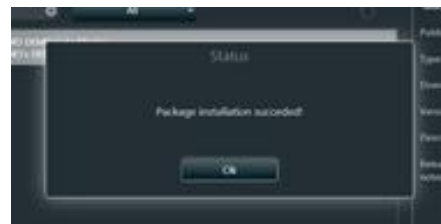
#### 1. Open Marketplace



#### 2. Navigate online models



#### 3. Install model





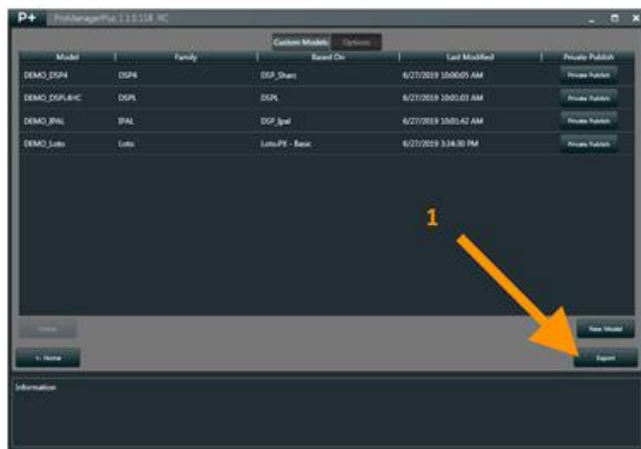
## Marketplace procedure (offline)

This method DOES NOT require an internet connection.

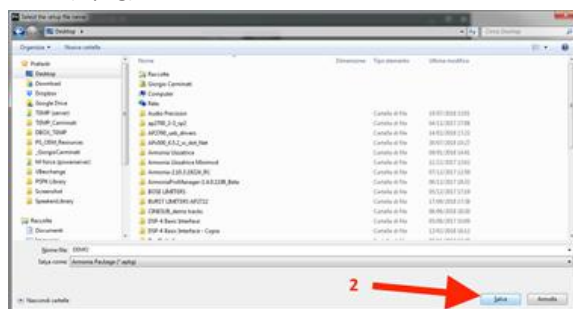
Open ProManagerPlus or navigate back to “Home”.

Open Custom Model Builder

### 1. Click “Export”



### 2. Save (.apkg) file



Open ArmoníaPlus

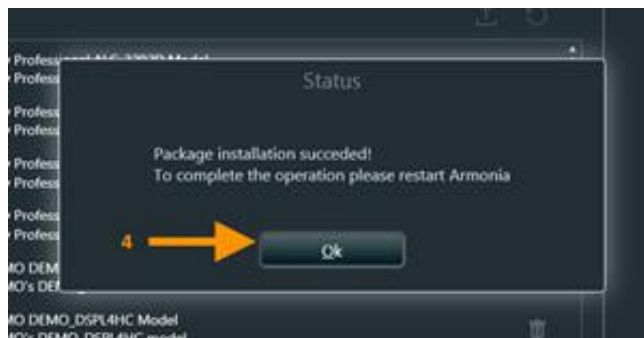
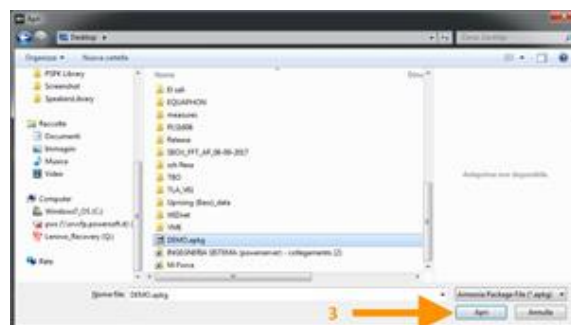
### 1. Open Marketplace



### 2. Open “Installed” and click “Install”



### 3. Load (.apkg) file



## 13 : 3.10. Check virtual model

After publishing a model, please ensure the virtual device matches your specs:

### ► Design-> Add Powered Speaker

Your Brand, Family and model should show up, along with the entire list of Applications within your Custom Model



### ► Model Image

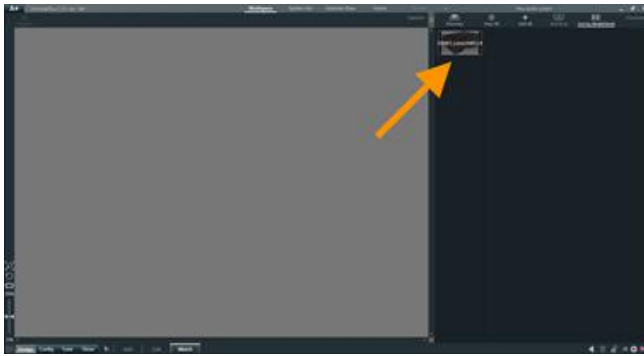
Make sure your model shows up with the correct image by adding virtual loudspeaker to the workspace





### 13:3.11. Check online model

Make sure ArmoniaPlus recognises your custom model:



Make sure to perform extensive functional testing of you Custom Model Prototype before proceeding towards Production.

# Production/Distribution

# 14

The production/distribution phase for LOTO-based loudspeakers includes two operations:

## ► Custom Model initialization

This involves initialising brand-new LOTO DSPs with a previously-validated Custom Model

## ► Public Publish

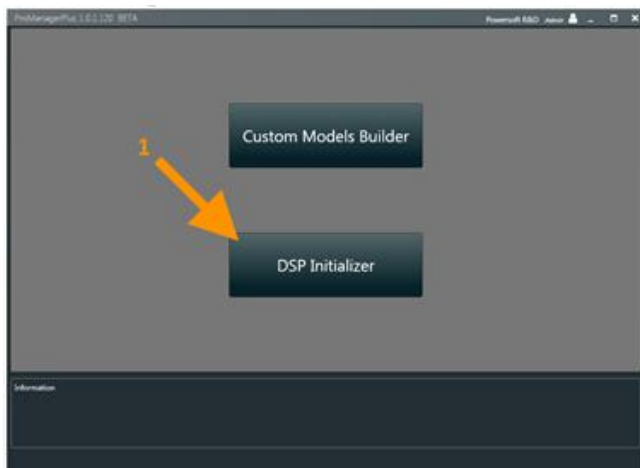
Public-publishing a model enable the end-users to install your loudspeaker model within ArmoníaPlus, thanks to Powersoft cloud-based Marketplace

## 14 : 1. Custom Model Initialization

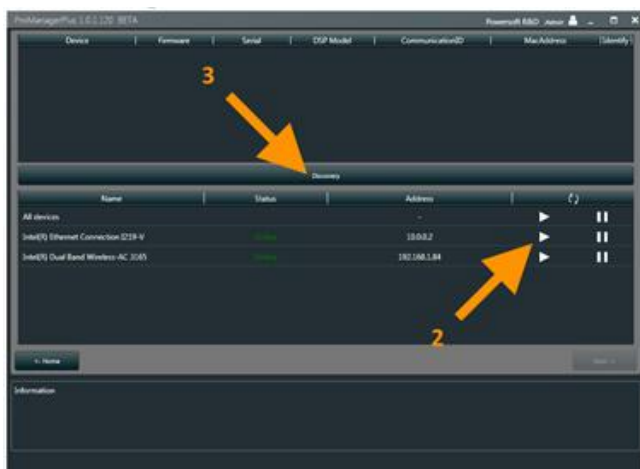
Connect LOTO to your network interface (wired).

Open ProManagerPlus or navigate back to “Home”.

1. Click “DSP\_INITIALIZER”



2. Click “Play” to open your network interface

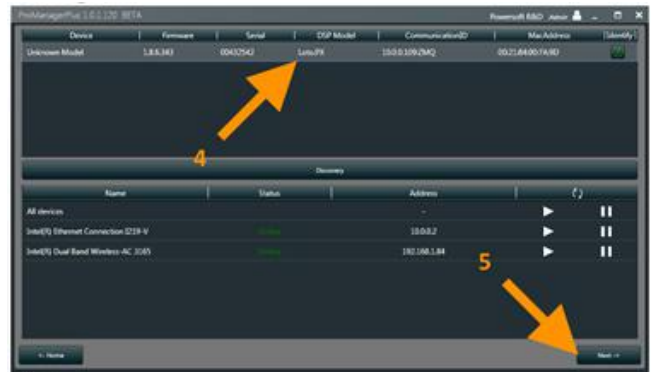


3. Click “Discovery”

Allow few seconds for Discovery to find the device.

4. Click on LOTO row

5. Click “Next”



Identifying discovered devices:

Unknown Model= identifies a brand-new DSPs

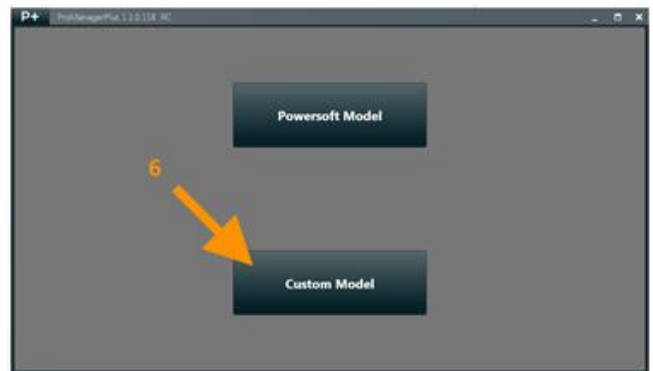
LOTO= identifies Powersoft Models

Custom Model DSPs shows up with Device Name as defined in Custom Model Builder

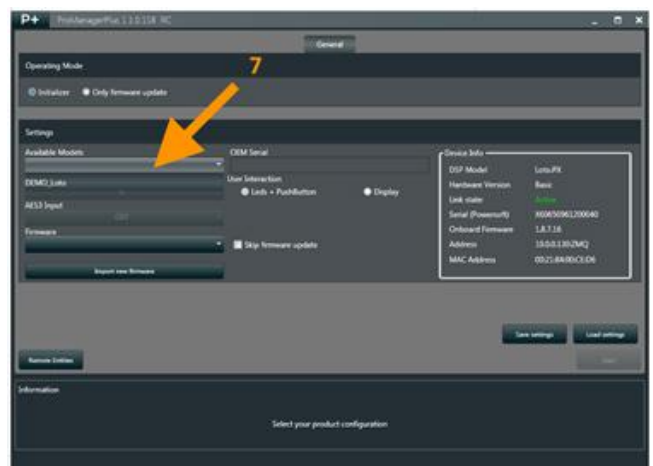
*Tip!*

Use the “Identify” button to recognise a device in a crowded network by blinking the device LEDs

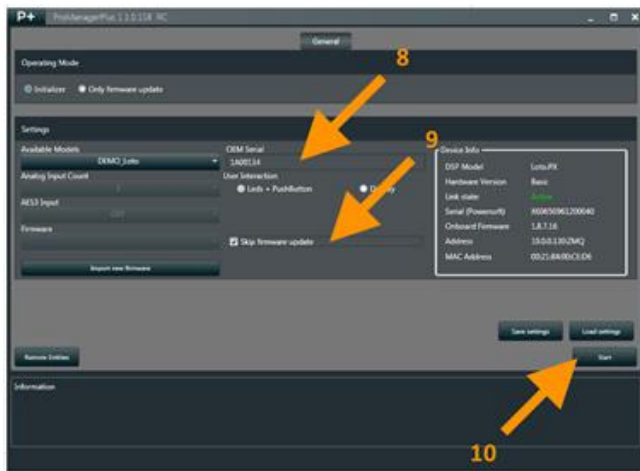
6. Click “Custom Model”



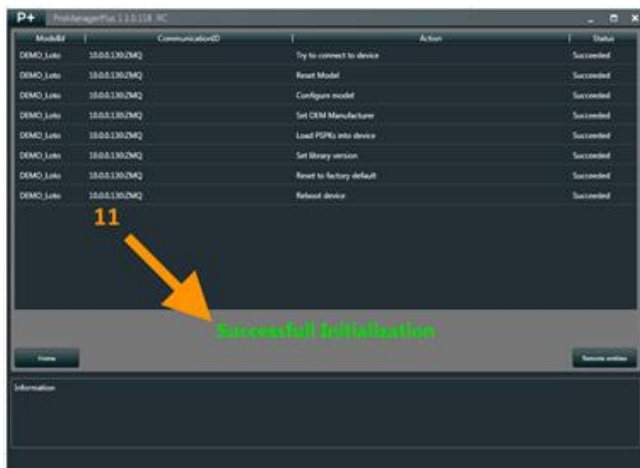
7. Select desired Model



8. Enter a unique Serial Number for your loudspeaker
9. Skip firmware (or update to latest if new fw is available)
10. Click “Start”



11. Wait until completed



### Important!

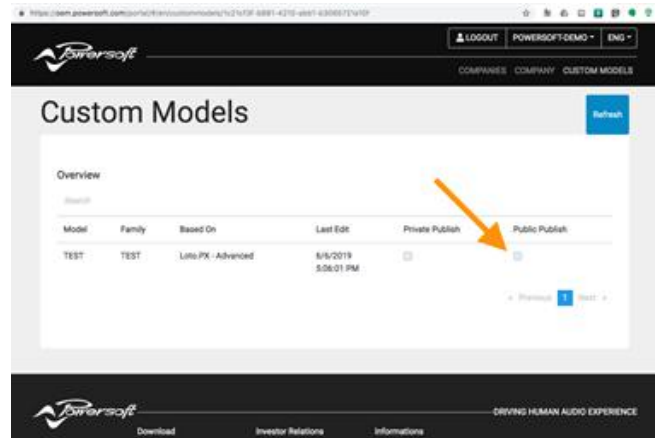
ProManager DO NOT wait for the DSP-reboot to complete!  
DO NOT power-off LOTO before the reboot completes!

## 14 : 2.Public Publish

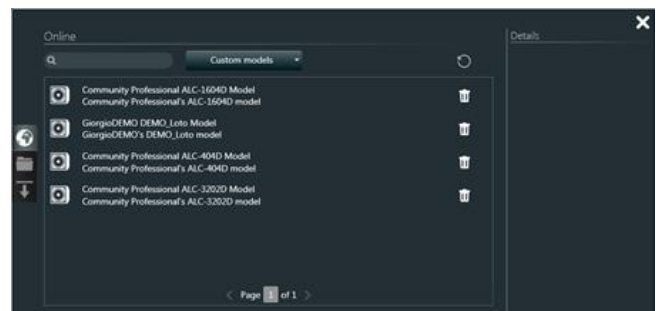
The Public Publish feature allows distributing each loudspeaker model individually through ArmoníaPlus Marketplace.

Once a model is publicly published, all end-users will be able to install it within their copy of ArmoníaPlus.

- Navigate [oem-powersoft.com](http://oem-powersoft.com) – Custom Models
- Tick “Public Publish” for the desired Model
- Log into ArmoníaPlus with an end-user only account



- Browse the Markeplace to make sure the model is now public



## Revising Existing Products

Custom Models for existing loudspeakers based on LOTO – DSP can be partially modified by double clicking the model in Custom Model Builder.

ProManager allows the following modifications:

### DESCRIPTION

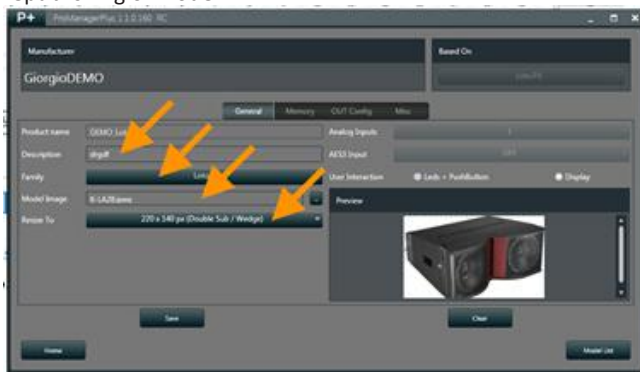
Applied to existing and freshly-initialised DSPs after republishing of model

### FAMILY

Applied to existing and freshly-initialised DSPs after republishing of model

### MODEL IMAGE

Applied to existing and freshly-initialised DSPs after republishing of model



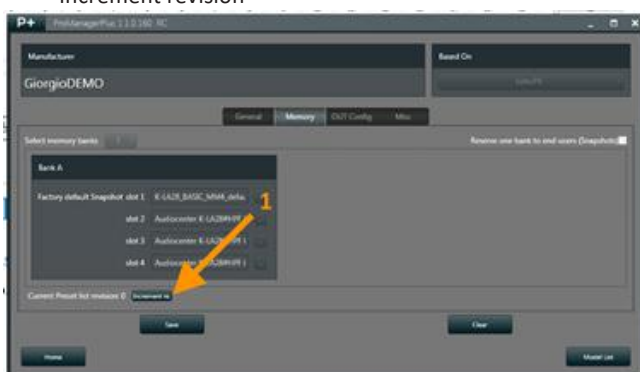
## 15 : 1.Preset List Revision

In Memory, ProManager allows to modify the existing default Snapshot and Applications.

A new Preset List revision applies to newly-initialised DSPs as well as existing products thanks to the Preset-List-Update feature within ArmoniaPlus.

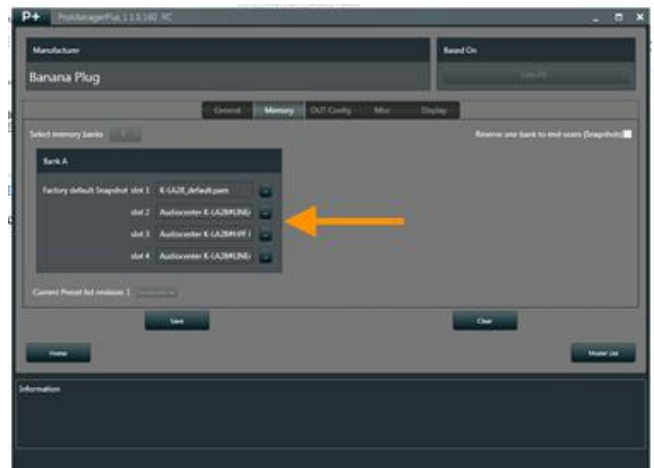
In-fact, re-publishing a Custom Model containing a new Preset List revision will also push the new preset to Powersoft cloud-based Marketplace, allowing end-users to install the new preset on their existing products with a click.

- Increment the model Preset List revision by clicking “Increment revision”



- Load new preset as required

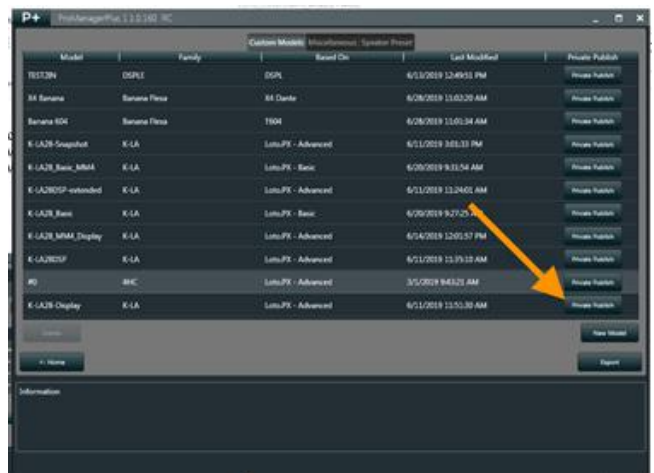
- Save Custom model



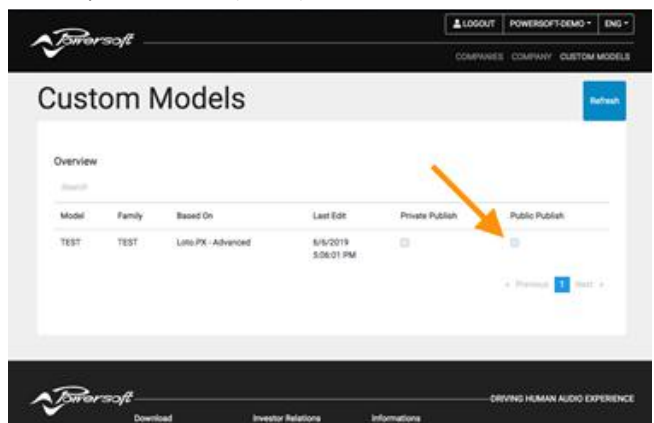
Replacing default Snapshot

ProManagerPlus will only accept new Snapshots provided they're generated from the exact same hardware

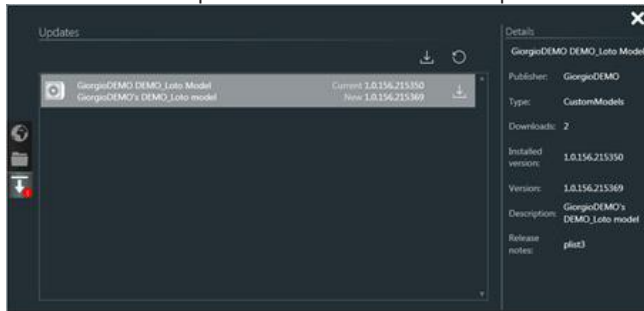
- Re-publish model (Private)



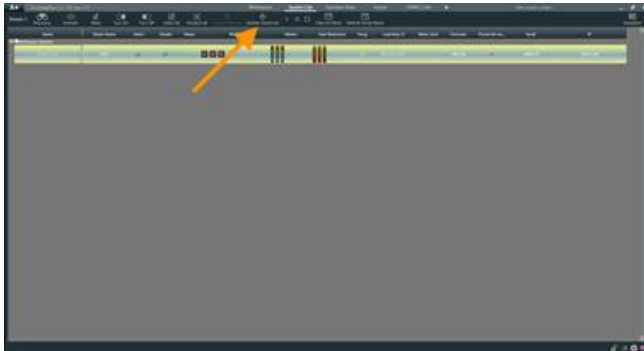
- Re-publish model (Public)



### ► Install model update in ArmoniaPlus - Marketplace

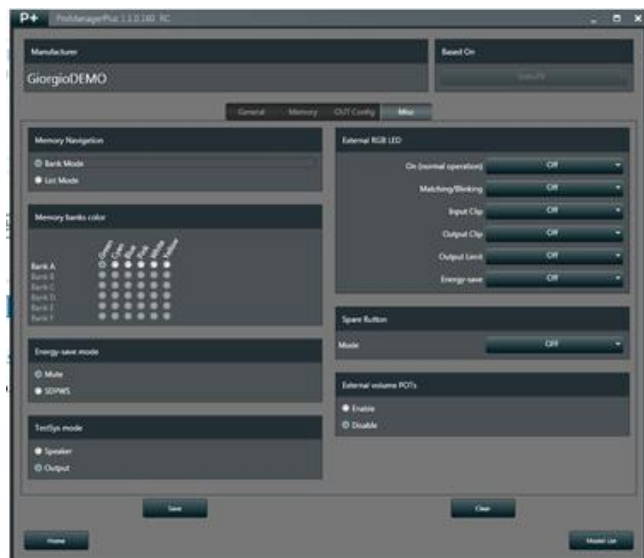


### ► Update online Loudspeaker within Preset List in ArmoniaPlus – System list



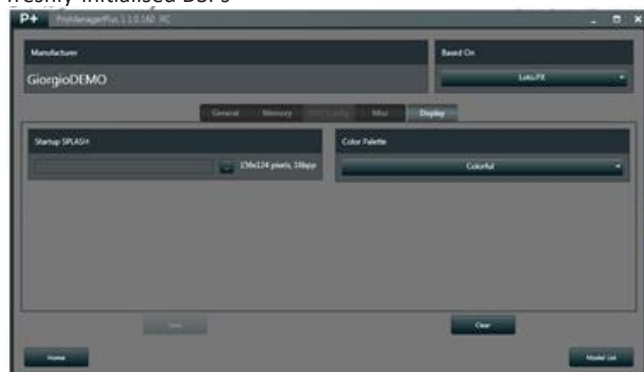
## 15 : 2. Miscellaneous

Modify any parameter; changes will only apply to freshly-initialised DSPs



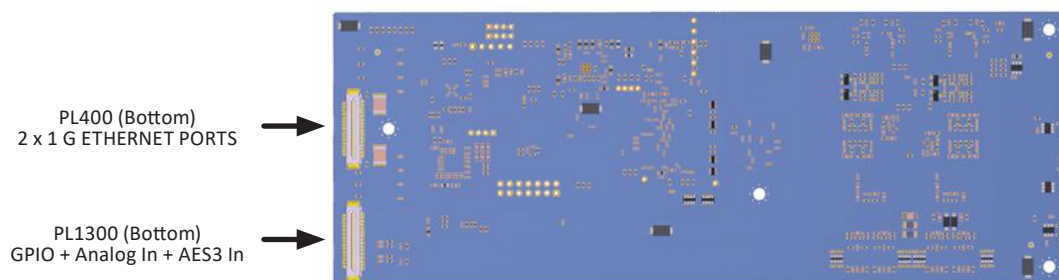
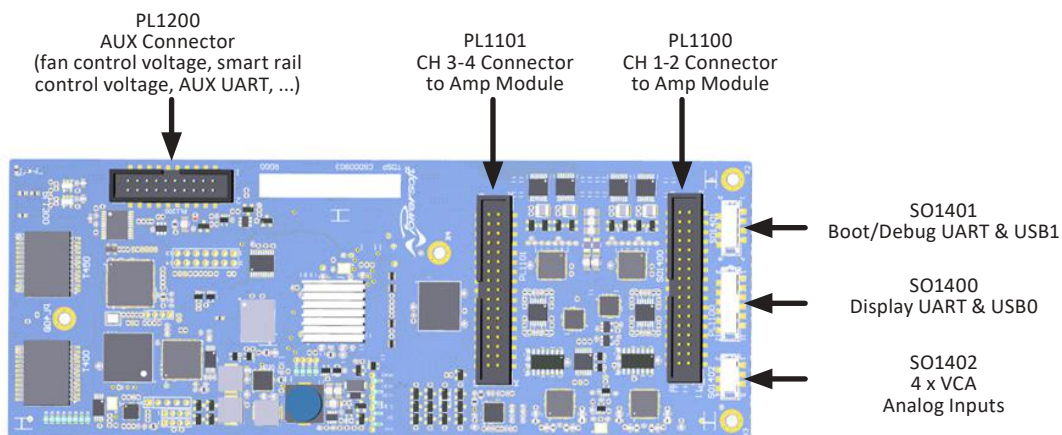
## 15 : 3. Display

Modify color theme/ startup logo, changes will only apply to freshly-initialised DSPs



## 16 : 1.DSP Core Pinout

PL1200	Aux. Connector + Fan control voltage + Smart rail control voltage + Aux UART
PL1101	CH3 – CH4 Connector to Amplifier Module
PL1100	CH1 – CH2 Connector to Amplifier Module
SO1401	Boot + Debug UART + USB1
SO1400	Display UART + SPI + USB0
SO1402	4 x VCA Analog Inputs
PL1300	GPIO + Analog Inputs + AES3 inputs
PL400	2x 1GB Ethernet Ports



PL1200		IDC 2.54mm pitch, 20pin	
Pin #	Name	Description	Details
1	FANCURR	Measure fan current	0 to 4V analog Input
2	EEVCC	+3.3V for external EE	Supply Out (3.3V)
3	EESCL	I2C clock for external EE	Digital GPIO (3.3V)
4	EESDA	I2C data for external EE	Digital GPIO (3.3V)
5	PSURXP	Bias for UART RX from PSU/Power board	Supply Out (3.3V)
6	PSURXN	9600bps UART RX from PSU/Power board	UART RX (3.3V)
7	FANCNTRL	0 to 12V analog out	Fan speed control
8	SRMCNTRL	0 to 5V analog out	Smart rail management
9	PGOOD	+12 is good	Digital GPIO (3.3V)
10	/12VEN	Enable +-12V	Digital GPIO (3.3V)
11	GND	Ground	0Vdc
12	GND	Ground	
13	+15VD	Digital supply	15Vdc
14	+15VD	Digital supply	15Vdc
15	VMONN	not connected	
16	VMONP	not connected	
17	HW0	Power board hardware version	Digital GPIO (3.3V)
18	HW1	Power board hardware version	Digital GPIO (3.3V)
19	HW2	Power board hardware version	Digital GPIO (3.3V)
20	PSUBOOST/TXP	UART TX (3.3V)	9600bps UART TX to PSU/Power board

SO1400		Tyco MicroMatch 12 pin	
Pin #	Name	Description	Details
1	GPIOFRONT	GPIO	
2	SCK-FRONT-B	clock SPI display	
3	MISO-FRONT	SPI data from display	
4	MOSI-FRONT-B	SPI data to display	
5	CS-FRONT-B	chip select SPI display	
6	GND	GND	
7	USB0P	USB0	Positive terminal
8	USB0N	USB0	Negative terminal
9	GND	GND	
10	+3.3V	Digital supply (max 100mA)	
11	DPLY-TX	UART TX to display	
12	DPLY-RX	UART RX from display	



SO1401		Tyco MicroMatch 10 pin	
Pin #	Name	Description	Details
1	UARTRX	Boot/console UART RX from PC terminal	
2	+3.3V	Digital supply (max 100mA)	
3	UARTTX	Boot/console UART TX to PC terminal	
4	BOOTSEL	Boot selection (if shorted to GND, boot from UART, first time programming)	
5	+5V	Digital supply (max 500mA)	
6	USB1P	USB1	
7	USB1N	USB1	
8	GND	GND	
9	/FRST	Reset display board MCU	
10	FBOOT0	Activate bootloader on front MCU	

SO1402		Tyco MicroMatch 6 pin	
Pin #	Name	Description	Details
1	POTF1	analog input (VCA control)	0 to +5Vdc (0 to -40dB attenuation)
2	POTF2	analog input (VCA control)	0 to +5Vdc (0 to -40dB attenuation)
3	POTF3	analog input (VCA control)	0 to +5Vdc (0 to -40dB attenuation)
4	POTF4	analog input (VCA control)	0 to +5Vdc (0 to -40dB attenuation)
5	POTREFF	+5V ext potentiometer polarization	
6	GND	GND	

**PL1300**

Pin #	Name	Description	Details
1	IN4_N	balanced analog input 4, inverting	
2	+3.3V	digital supply, max 100mA	
3	IN4_P	balanced analog input 4, not inverting	
4	IN3_N	balanced analog input 3, inverting	
5	GND		
6	IN3_P	balanced analog input 3, not inverting	
7	AES2_P	second AES3 input, positive	
8	GND		
9	AES2_N	second AES3 input, negative	
10	+12V	analog supply, max 100mA	
11	-12V	analog supply, max 100mA	
12	GND		
13	AES1_P	first AES3 input, positive	
14	GND		
15	AES1_N	first AES3 input, negative	
16	IN2_P	balanced analog input 2, not inverting	
17	+3.3V	digital supply, max 100mA	
18	IN2_N	balanced analog input 2, inverting	
19	IN1_P	balanced analog input 1, not inverting	
20	+5V	digital supply, max 500mA	
21	IN1_N	balanced analog input 1, inverting	
22	+5V		
23	POTF1	analog input (VCA control)	
24	POTF2	analog input (VCA control)	
25	SCK-REAR-B	clock SPI connector interface	
26	MISO-REAR	SPI data from connector interface	
27	MOSI-REAR-B	SPI data to connector interface	
28	CS-REAR-B	SPI chip select connector interface	
29	IF-GPIO1	GPIO1	
30	IF-GPIO2	GPIO2	
31	GND		

**PL400**

Pin #	Name	Description	Details
1	ACHS	chassis first ethernet port	
2	AETH78_N	first ethernet port pin 8 RJ45	
3	AETH45_N	first ethernet port pin 5 RJ45	
4	AETH78_P	first ethernet port pin 7 RJ45	
5	AETH45_P	first ethernet port pin 4 RJ45	
6	AETHRX_N	first ethernet port pin 6 RJ45	
7	AETHTX_N	first ethernet port pin 2 RJ45	
8	AETHRX_P	first ethernet port pin 3 RJ45	
9	AETHTX_P	first ethernet port pin 1 RJ45	
10	ACHS	chassis first ethernet port	
11, 12, 13		not connected	
14	LED-P3	first ethernet port LED negative	
15	LED-P4	second ethernet port LED negative	
16	LED-LINK	link LED positive	
17	LED-SPEED	speed LED positive	
18, 19, 20, 21		not connected	
22	BCHS	chassis second ethernet port	
23	BETH78_N	second ethernet port pin 8 RJ45	
24	BETH45_N	second ethernet port pin 5 RJ45	
25	BETH78_P	second ethernet port pin 7 RJ45	
26	BETH45_P	second ethernet port pin 4 RJ45	
27	BETHRX_N	second ethernet port pin 6 RJ45	
28	BETHTX_N	second ethernet port pin 2 RJ45	
29	BETHRX_P	second ethernet port pin 3 RJ45	
30	BETHTX_P	second ethernet port pin 1 RJ45	
31	BCHS	chassis second ethernet port	

**PL1100 (To Amplifier channels 1, 2)**

Pin#	Name	Type	Description	Range	Scale Factor	Impedance
1	SDPWS	OUT	Power supply shut down. Active High. Enable energy save mode			
2	\	NC	\	\	\	\
3	RESERVED	\	\	\	\	\
4	\	NC	\	\	\	\
5	GND	POWER	Reference Ground			
6	OUT1+	OUT	Channel 1 balanced output (non-inverting)			
7	OUT1-	OUT	Channel 1 balanced output (inverting)			
8	GND		Reference Ground			
9	VOUT1MON	IN	Amplifier Channel 1 output voltage monitor		20V/V	
10	PROTECT1	IN	Amplifier Channel 1 output stage protection monitor. Low when output is in protect state			
11	IOUT1MON	IN	Amplifier Channel 1 output current monitor		8.35A/V	
12	TEMPMON12	IN	Amplifier Output stages 1&2 temperature monitor.			
13	+12VDC OUT	POWER	Regulated +12VDC (+/-10%) supply voltage			
14	-12VDC OUT	POWER	Regulated -12VDC (+/-10%) supply voltage			
15	MUTE1	OUT	Channel 1 hardware mute. Active low.	5V, 100mA		Open collector. (Expected 4,7kOhm pull up resistor to 5V)
16	+VCCMON	IN	Amplifier Positive rail bus monitor		20V/V	
17	-VCCMON	IN	Amplifier Negative rail bus monitor		20V/V	
18	-VCCMON	IN	Amplifier Negative rail bus monitor		20V/V	
19	+VCCMON	IN	Amplifier Positive rail bus monitor		20V/V	
20	MUTE2	OUT	Channel 2 hardware mute. Active low.	5V, 100mA		Open collector. (Expected 4,7kOhm pull up resistor to 5V)
21	-12VDC OUT	POWER	Regulated -12VDC (+/-10%) supply voltage			
22	+12VDC OUT	POWER	Regulated +12VDC (+/-10%) supply voltage			
23	TEMPMON12	IN	Amplifier Output stages 1&2 temperature monitor.			
24	IOUT2MON	IN	Amplifier Channel 2 output current monitor		8.35A/V	
25	PROTECT2	IN	Amplifier Channel 2 output stage protection monitor. Low when output is in protect state.			
26	VOUT2MON	IN	Amplifier Channel 2 output voltage monitor		20V/V	
27	GND	POWER	Reference Ground			
28	OUT2-	OUT	Channel 2 balanced output (non-inverting)			
29	OUT2+	OUT	Channel 2 balanced output (inverting)			
30	GND	POWER	Reference Ground			
31	\	NC	\	\	\	\
32	RESERVED	\	\	\	\	\
33	\	NC	\	\	\	\
34	SDPWS	OUT	Power supply shut down. Active High. Enable energy save mode			

**PL1101 (To Amplifier channels 3, 4)**

Pin#	Name	Type	Description	Range	Scale Factor	Impedance
1	SDPWS	OUT	Power supply shut down. Active High. Enable energy save mode			
2	\	NC	\	\	\	\
3	RESERVED	\	\	\	\	\
4	\	NC	\	\	\	\
5	GND	POWER	Reference Ground			
6	OUT3+	OUT	Channel 3 balanced output (non-inverting)			
7	OUT3-	OUT	Channel 3 balanced output (inverting)			
8	GND		Reference Ground			
9	VOUT1MON	IN	Amplifier Channel 3 output voltage monitor		20V/V	
10	PROTECT3	IN	Amplifier Channel 3 output stage protection monitor. Low when output is in protect state			
11	IOUT3MON	IN	Amplifier Channel 3 output current monitor		8.35A/V	
12	TEMPMON12	IN	Amplifier Output stages 3&4 temperature monitor.			
13	+12VDC OUT	POWER	Regulated +12VDC (+/-10%) supply voltage			
14	-12VDC OUT	POWER	Regulated -12VDC (+/-10%) supply voltage			
15	MUTE3	OUT	Channel 3 hardware mute. Active low.	5V, 100mA		Open collector. (Expected 4,7kOhm pull up resistor to 5V)
16	+VCCMON	IN	Amplifier Positive rail bus monitor		20V/V	
17	-VCCMON	IN	Amplifier Negative rail bus monitor		20V/V	
18	-VCCMON	IN	Amplifier Negative rail bus monitor		20V/V	
19	+VCCMON	IN	Amplifier Positive rail bus monitor		20V/V	
20	MUTE4	OUT	Channel 4 hardware mute. Active low.	5V, 100mA		Open collector. (Expected 4,7kOhm pull up resistor to 5V)
21	-12VDC OUT	POWER	Regulated -12VDC (+/-10%) supply voltage			
22	+12VDC OUT	POWER	Regulated +12VDC (+/-10%) supply voltage			
23	TEMPMON12	IN	Amplifier Output stages 1&2 temperature monitor.			
24	IOUT4MON	IN	Amplifier Channel 4 output current monitor		8.35A/V	
25	PROTECT4	IN	Amplifier Channel 4 output stage protection monitor. Low when output is in protect state.			
26	VOUT4MON	IN	Amplifier Channel 4 output voltage monitor		20V/V	
27	GND	POWER	Reference Ground			
28	OUT4-	OUT	Channel 4 balanced output (non-inverting)			
29	OUT4+	OUT	Channel 4 balanced output (inverting)			
30	GND	POWER	Reference Ground			
31	\	NC	\	\	\	\
32	RESERVED	\	\	\	\	\
33	\	NC	\	\	\	\
34	SDPWS	OUT	Power supply shut down. Active High. Enable energy save mode			

## Specifications:

### General

Internal processing	32 bits floating point, 48kHz sample rate
Latency	2.5ms fixed latency architecture
Configuration	2 input / 4 outputs
User Data Storage	Up to 24 local presets, up to 50 via Armonía Pro
Firmware Update	Audio Suite™ software

### Audio

Frequency Response	20 Hz - 20 kHz (+0, -1 dB)
Input Impedance	10kOhm (unbalanced) 20kOhm (balanced)
Max Input Voltage	12.27Vrms / 24dBu / 127dB SNR
Max Output Voltage	5.3Vrms / 16.7dBu / 118dB SNR
SNR	>118dB
THD	< 0.02% (20 Hz - 20 kHz)

### DSP

AD converters	24 Bit Tandem™ @ 48 kHz 125 dB-A Dynamic Range - 0.005 % THD+N
DA converters	24 Bit Tandem™ @ 48 kHz 117 dB-A Dynamic Range - 0.003 % THD+N
Sample rate converter	24 Bit @ 44.1 kHz to 192 kHz 140 dB Dynamic Range - 0.0001 % THD+N
Internal precision	32 bit floating point
Latency	2.5 ms fixed latency architecture
Memory/Presets	128 MB (RAM) plus 512 MB flash for presets
Delay	2 s (input) + 100 ms (output) for time alignment
Equalizer	Raised-cosine, custom FIR, parametric IIR: peaking, hi/lo-shelving, all-pass, band-pass, band-stop, hi/lo-pass
Crossover	linear phase (FIR), Butterworth, Linkwitz-Riley, Bessel: 6 dB/oct to 48 dB/oct (IIR)
Limiters	TruePower™, RMS voltage, RMS current, Peak limiter
Damping control	Active DampingControl™ and LiveImpedance™ measurement

### Networking

Standard compliance	Integrated two port 1G ethernet switch
Remote Control	ArmoníaPlus™ software



DRIVING HUMAN AUDIO EXPERIENCE

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