



HARRIS CORPORATION

Broadcast
Communications Division
5300 Kings Island Drive Suite 101
Mason, OH USA 45040
phone 1-513-459-3400
fax 1-513-459-3796

www.harris.com

May 11, 2011

State of West Virginia
Purchasing Division
Attn: Shelly Murray
600 Capital Street
Charleston, WV 25301-1223

Dear Ms. Murray:

On behalf of Mr. Mark Voorhees and HARRIS Corporation's Broadcast Communications Division, we are pleased to submit the following bid, in response to your Request for Quotation # EBA342 for "Digital Television Transmitter System".

Harris is proposing the UHF Maxiva UAX air-cooled system. This transmitter is designed with the Harris® PowerSmart™ technology and the Harris Apex M2X™ multimedia exciter.

Should you require additional information or have any questions, please do not hesitate to contact Mark Voorhees, District Sales Manager, at 513-830-6109 (office), or myself.

Thank you for your consideration. We look forward to a successful relationship.

Respectfully Submitted,

Rich Lohmueller
Proposals Manager, Transmission
Broadcast Communications Division
Rich.Lohmueller@Harris.com
513-459-3482 – phone
321-726-3237 – fax

RECEIVED

2011 MAY -9 PM 12:51

WV PURCHASING
DIVISION



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To:
 WSWP-TV
 124 Industrial Park Drive
 BEAVER, WV, USA 25813
Attn: Shelly Murray
 Phone: (304) 558-8801
 Fax: (304) 558-4115
 Email: shelly.l.murray@wv.gov

From:
 Harris Corporation
 3200 Wismann Lane
 Quincy, IL, USA 62301

 Mark Voorhees
 District Sales Manager, TV
 Phone: (513) 830-6109
 Fax: (321) 727-9348
 Email: mvoorhee@harris.com

Summary – All Prices in USD

	Total Price
Maxiva 2KW Solid State Transmitter	\$73,062.50
Mask Filter	\$7,378.82
Hardware, Transmission Line, Couplers & Adapters	\$1,461.18
Receiver/Decoder	\$4,200.00
Power Meter	\$2,396.00
Total Equipment/Services	\$88,498.50
Total Quote Price (Options Not Included)	\$88,498.50

Options

	Total Price
Optional Dual Exciter	\$17,000.00
Optional Commissioning Services	\$10,584.00
Optional Installation Services	\$12,750.30
Optional Spare RF PA Module	\$1,759.50
Optional Surge Suppressor	\$2,975.00
Optional Accessories	\$7,858.01

Estimated Shipment from factory: TBD
 Payment Terms: Net 30 Days
 Freight Terms: F.O.B. Dest. Beaver, WV
 I authorize Harris to publicize this purchase

Is the purchase of this equipment or services exempt from sales tax? YES or NO

If NO - sales tax will be added to your invoices at the rate assigned to the ship to address.

If YES - Sales Tax Exemption Number _____ COPY OF CERTIFICATE MUST BE ATTACHED

Who can we contact regarding sales tax questions on behalf of your company?

Name: _____

Phone Number: _____

Bill To:
 WSWP-TV
 600 Capitol Street
 Charleston, WV, USA 25301-1223
Attn: Shelly Murray
 Phone: (304) 558-8801
 Fax: (304) 558-4115
 Email: shelly.l.murray@wv.gov

Ship To:
 WSWP-TV
 600 Capitol Street
 Charleston, WV, USA 25301-1223
Attn: Shelly Murray
 Phone: (304) 558-8801
 Fax: (304) 558-4115
 Email: shelly.l.murray@wv.gov

Quote #: 1-7NINIJ Revision # : 1
Payment Terms: Net 30 Days
Effective Date: 11-May-2011
Valid Through: 10-Jun-2011
Fax Orders to (217) 221-7078

Price Detail – All Prices in USD

Maxiva 2KW Solid State Transmitter					
No.	Qty	Part #	Description	Unit Price	Ext. Price
1	1	UAX-2000ATRK37D	UAX-2000AT WITH 37RU DELUXE RA "Harris Maxiva Series UAX-2000AT Air-Cooled, Solid-State, ATSC Television Transmitter. Band IV/V, 470-860MHz. Transmitter Pre-Filter Power 2,500W Average. System Output Power 2000W Average DTV Power After Filter (assumes filter loss up to 1.0dB). Single-Phase, 208 -240 Volts -15%/+10%, 47-63Hz. Optional: Three-Phase, 208-240 or 380-415 Volts, -15%/+10%, 47-63Hz (with optional Power Distribution Panel)."	\$70,312.50	\$70,312.50
2	1	UAX-OPT-U	UAX(TM) UPS OPTION MAXIVA UAX (TM) BATTERY B/U OPTION Built-in Battery backup for exciter frequency processing unit	\$250.00	\$250.00
3	1	UAX-1YRWARRANTY	Maxiva UAX standard 1 year Warranty Expires 15 months from date of shipment. Warranty void if transmitters is not protected by a properly sized Series Surge suppressor. Additional Details of this warranty are covered in the Harris General Terms and Conditions.	\$0.00	\$0.00
4	1	NPN	FREIGHT F.O.B. Dest. Beaver, WV	\$2,500.00	\$2,500.00
Mask Filter					
No.	Qty	Part #	Description	Unit Price	Ext. Price
5	1	FL-3200IS	FILTER, MASK UHF 8-POLE 4kW Reflective 3.2kW ATSC MASK Filter Factory Tunable to any 6MHz Channel in Band IV/V 1-5/8" EIA Flanged connectors	\$7,378.82	\$7,378.82
Hardware, Transmission Line, Couplers & Adapters					
No.	Qty	Part #	Description	Unit Price	Ext. Price
6	1	STDLINEKT1-5810FT	KIT, RF XMSN LINE 1-5/8 10FT KIT, RF XMSN LINE 1-5/8 10FT KIT CONTAINS: QTY (1) 10FT PIECE OF 1-5/8 XMSN LINE QTY (2) UNFLANGED TO FLANGED ADAPTERS QTY (2) BULLETS QTY (2) COUPLING SLEEVES WITH INNERS QTY (1) 90 DEGREE EQUAL LENGTH UNFLANGED ELBOW	\$1,461.18	\$1,461.18

Receiver/Decoder					
No.	Qty	Part #	Description	Unit Price	Ext. Price
7	1	VSB-FRQ-200	DTV CHANNEL CONVERTER VSB-FRQ-200 8-VSB Terrestrial Signal to DVB-ASI and SMPTE-310M Signal Converter with PSIP Update capability. 1RU	\$4,200.00	\$4,200.00

Power Meter					
No.	Qty	Part #	Description	Unit Price	Ext. Price
8	1	BRD5000A100-11	POWER METER Hand-Held Digital Power Meter Including: 5000XT power meter 5011 power sensor Hard carrying case and standard accessories	\$2,396.00	\$2,396.00

					Total Price
Maxiva 2KW Solid State Transmitter					\$73,062.50
Mask Filter					\$7,378.82
Hardware, Transmission Line, Couplers & Adapters					\$1,461.18
Receiver/Decoder					\$4,200.00
Power Meter					\$2,396.00

Total Equipment/Services					\$88,498.50
Total Quote Price (Options Not Included)					\$88,498.50

Options

Optional Dual Exciter					
No.	Qty	Part #	Description	Unit Price	Ext. Price
9	1	UAX-DDAT	Dual Drive Option ATSC (1) 4 RU Multi Standard Exciter/Driver with: - ATSC Software loaded - RTAC(TM) (Real-Time Adaptive Correction) - Easy-to use operator interface via standard Web browser and external PC - Built-in compliance monitoring (limited suite) - Two inputs any combination of ASI or SMPTE 310M with auto switching - 10Mhz and 1PPS inputs - (2) UHF Broadband LDMOS Power Amplifier - (2) Power Supply - Front panel display of transmitter parameters (1) Dual Drive Control Unit including: - Color LCD touch panel GUI - Power supply - Web Remote with RJ45 connector - External I/O board with parallel remote interface	\$17,000.00	\$17,000.00

Optional Commissioning Services					
No.	Qty	Part #	Description	Unit Price	Ext. Price
10	1	NPN	UAX Commissioning Harris Standard Terms and Conditions Apply	\$10,584.00	\$10,584.00

			<p>Includes labor and expenses for (1) Harris engineer or qualified subcontractors to perform work on site.</p> <p>Includes commissioning services of a (1) single PA cabinet UAX transmitter, (1) floor mounted RF mask filter (air cooled), (1) system test load , (1) 3 port or 4 port RF patch panel or RF switch if purchased.</p> <p>Includes complete system commissioning into know good test load , commissioning test will be performed utilizing Harris calibrated test equipment and standard commissioning test/documentation to Harris standard specifications.</p> <p>Project will be considered and planned to be a start to finish project without delay from installation to commissioning of system into known good test load. Assumes all Harris supplied equipment has been delivered to site prior to Harris's arrival to site.</p> <p>Project details and assumptions:</p> <p>Assumes all Harris supplied equipment has been completely and properly installed and ready for immediate turn on upon Harris's arrival.</p> <p>Assumes site access a minimum of 6 days a week and 10 hours per day.</p> <p>Assumes appropriate electrical and HVAC work to support new equipment has been completed prior to Harris's.</p> <p>Assumes customer qualified staff shall be available to support Harris engineers with appropriate site access and other needs as they arise.</p> <p>Work schedule shall be 6 days a week and a minimum of 10 hours per day unless other arrangements are negotiated prior to project start dates.</p> <p>Assumes customer shall support Harris Engineer with all necessary in country travel and appropriate site access to maintain an aggressive schedule to allow completion of the project without delay. Customer to provide interpreter on-site to communicate to local staff as necessary.</p> <p>Does not include repair of any existing transmitter/s or any other customer equipment that will be reused in final configuration. Repairs if required and agreed upon will be charged at the standard Harris daily rates plus expenses.</p> <p>Does not include Installation or Commissioning Services of any Harris supplied equipment as related to towers, antennas or transmission line from tower to building. Does not include any work beyond commissioning and operational testing of any Harris supplied remote control equipment at site, customer responsible for configuration and connection to any link to studio that may exist.</p> <p>Please refer to Harris Standard Terms and Conditions of installation for other details</p> <p>Does not include any taxes, duties or VAT as related to services performed on -site.</p>		
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Optional Installation Services

No.	Qty	Part #	Description	Unit Price	Ext. Price
11	1	NPN	<p>UAX Install</p> <p>Harris Standard Terms and Conditions Apply</p> <p>Includes labor and expenses for (1) Harris engineer or qualified subcontractors to perform work on site.</p> <p>Includes complete installation and interconnection of a (1) single PA cabinet UAX transmitter, (1) floor mounted RF mask filter (air cooled), (1) system test load , (1) 3 port or 4 port RF patch panel or RF switch if purchased.</p> <p>Includes installation of RF components utilizing clip coupling components and assumes no soldiering is necessary on site.</p> <p>Includes complete system commissioning into know good test load , commissioning test will be performed utilizing Harris calibrated test equipment and standard commissioning test/documentation to Harris standard specifications.</p> <p>Project will be considered and planned to be a start to finish project without delay from installation to commissioning of system into known good test load. Assumes all Harris supplied equipment has been delivered to site prior to Harris's arrival to site.</p> <p>Project details and assumptions:</p> <p>Assumes all Harris supplied equipment has been delivered to site prior to Harris's arrival.</p> <p>Assumes site access a minimum of 6 days a week and 10 hours per day.</p> <p>Assumes there is adequate space within the facilities to support the installation of all supplied equipment without the removal of any existing</p>	\$12,750.30	\$12,750.30

			<p>equipment. Assumes adequate and proper space existing external to the building to support cooling system. Assumes appropriate electrical and HVAC work to support new equipment has been completed prior to Harris's. Assumes customer hired electrician shall be on site day of or day after Harris's arrival to site to discuss equipment layout and final AC connection to each. Assumes electrical work can be completed without delaying installation and commissioning of equipment. Assumes customer qualified staff shall be available to support Harris engineers with appropriate site access and other needs as they arise. Work schedule shall be 6 days a week and a minimum of 10 hours per day unless other arrangements are negotiated prior to project start dates. Assumes customer shall support Harris Engineer with all necessary in country travel and appropriate site access to maintain an aggressive schedule to allow completion of the project without delay. Customer to provide interpreter on-site to communicate to local staff as necessary. Assumes customer's antenna connection is within 12ft of location of RF mask filter. Does not include repair of any existing transmitter/s or any other customer equipment that will be reused in final configuration. Repairs if required and agreed upon will be charged at the standard Harris daily rates plus expenses. Does not include any disposal of any equipment that may have been removed during installation process. Customer shall be responsible for proper storage or disposal. Does not include Installation or Commissioning Services of any Harris supplied equipment as related to towers, antennas or transmission line from tower to building. Does not include any work beyond commissioning and operational testing of any Harris supplied remote control equipment at site, customer responsible for configuration and connection to any link to studio that may exist. Please refer to Harris Standard Terms and Conditions of installation for other details Does not include any taxes, duties or VAT as related to services performed on -site.</p>		
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Optional Spare RF PA Module

No.	Qty	Part #	Description	Unit Price	Ext. Price
12	1	UAX SPARE PA	ASSY, FULL PA PALLET Spare Power Amplifier	\$1,759.50	\$1,759.50

Optional Surge Suppressor

No.	Qty	Part #	Description	Unit Price	Ext. Price
13	1	LEADS21220:2501 501	Series Surge suppressor 1 Phase Series Surge suppressor 1 Phase 150A 220 to 250V 50/60Hz Dyna System - Series Connected Unit - Modular. Uses MOV technology, combined with LC filter for superior protection. Inductors are 1-100µH, NEMA 12 rated enclosure. Phase conductors ranges from 16 to 95mm2, Neutral conductor ranges from 16 to 50mm2, safety and transient ground conductors ranges from 1.5 to 50mm2. Standard feature: Indicator Lights. Optional features available: A - dry contacts, B - digital surge counter/dry contacts, C - Audible alarm with disable switch/dry contacts, H - Spare modules, M - Combination of options A, B and C, PNL - Panel only for internal switchboard mounting. Dimensions - H: 121.92cm, W: 60.96cm, D: 22.35cm. Weight: 36kg.	\$2,975.00	\$2,975.00

Optional Accessories

No.	Qty	Part #	Description	Unit Price	Ext. Price
14	1	UAX-OPT-G	APEX M2X (TM) GPS INPUT OPTION UAX GPS INPUT OPTION Integrated Global Positioning Satellite input. -GPS antenna and cable sold separately	\$2,125.00	\$2,125.00
15	1	GPS-ANT-KIT-HG	GPS ANTENNA KIT GPS Antenna Kit, includes:	\$712.39	\$712.39

			* High gain GPS Antenna * 100 foot (30 meters) RG59 cable with TNC-M and SMA-M connectors * Mounting kit		
16	1	STDPATCHPNL1-583	ASSY, 1-5/8 3 PORT RF PATCH PN ASSY, 1-5/8 3 PORT RF PATCH PANEL Includes (2) DPDT Interlocks and (1) U-Link	\$3,208.00	\$3,208.00
17	1	STDLOAD2500W	LOAD, 2.5KW DC-1GHZ 50 OHM	\$1,812.62	\$1,812.62

This Quote, and any Order resulting from this Quote, is subject to the Harris Standard Terms and Conditions of Sale for the Broadcast Communications Division which are located at <http://www.broadcast.harris.com/terms/> and which are incorporated herein by reference. The Harris Standard Terms and Conditions of Sale for the Broadcast Communications Division shall apply to the exclusion of any other terms and conditions except where expressly agreed in writing and signed by Harris. For a hardcopy of these terms and conditions, please call (U.S.) 303-476-5000, fax your request to 303-476-5004, or email your request to BCDContracts@harris.com.

Harris Approval:

Mark Voorhees, District Sales Manager, TV, (513) 830-6109

Customer Approval:

Title:

Date:

Purchase Order #:

Fax signed quote to (321) 727-9348 or email to mvoorhee@harris.com.

**Harris Corporation**

*Standard Terms and Conditions of Sale for Broadcast Communications Division
Version 1.2 092309*

Customer, by submitting a Purchase Order or signing the Quote, expressly warrants to, and agrees with, Harris as follows:

1. Definitions

In addition to the terms defined elsewhere in this Agreement, the following terms used herein have the following meanings:

- a. **Agreement:** These Standard Terms and Conditions of Sale, along with the Order, all as acknowledged by Harris on its standard acknowledgement form.
- b. **Customer:** The purchaser of Equipment, Software, or Services from Harris.
- c. **Equipment:** Any hardware, including components, and excluding any Software or Services;
- d. **Harris:** Harris Corporation, acting through its Broadcast Communications Division or the Harris affiliate identified on the Quote.
- e. **Order:** Customer's purchase order or signed Quote.
- f. **Quote:** The price quotation of Harris itemizing the purchase price, and all exhibits referred to within such Quote, including without limitation the technical proposal, technical specifications, scope of work and any maintenance or other agreement specifically included in the purchase price.
- g. **Services:** Installation, warranty, maintenance support, integration, or other services to be provided to Customer as part of this Agreement.
- h. **Software:** The individual executable programs as itemized in the Quote and the data structures accessed internally by such executable programs; any source code, custom code, file layouts, database dictionaries or other file schema for the Software that may be provided; all manuals, configuration lists and other associated documentation material procured under this Agreement including, without limitation, any computer or web-based training materials; all data and information obtained via Harris' websites or portals; and any updates, enhancements, upgrades or subsequent versions to any of the foregoing.

2. Quotes/Orders

- a. **Validity of Quote.** All Quotes are an invitation for an offer and automatically expire after thirty (30) days unless an extension of such period is granted or agreed to in writing by Harris.
- b. **Order Acceptance.** This Order is accepted by Harris only on the exact terms and conditions set forth herein and in the Quote, all of which shall constitute the final, complete and exclusive statement of the terms and conditions between Customer and Harris regarding the purchase, sale and/or licensing of Equipment, Software and/or Services covered by this Order. Customer specifically agrees that any additional or conflicting terms and conditions contained in Customer's purchase order or other document are rejected by Harris and will be void, unless expressly accepted in writing and signed by an authorized representative of Harris. The failure of Harris to object seasonably to any such term and condition in Customer's purchase order or signed Quote will not constitute a waiver of this Agreement. In the event the terms of this Order conflict with the terms of the Quote or any attachment thereto, the terms of the Quote shall control. If any shipment is made of any part hereof, or if Services are provided by Harris hereunder, it is understood and agreed that the terms and conditions of this Agreement are satisfactory and accepted by Customer in their entirety, without modification, notwithstanding the lack of Customer's written approval hereof. Acceptance of Customer's Order by Harris is contingent upon approval of Customer's credit. Customer's Order shall be deemed accepted by Harris only when Harris transmits to Customer its standard acknowledgement form.
- c. **Changes to Equipment.** Model, nomenclature and the mechanical and electrical design of Equipment described herein are subject to change without notice, provided that they do not affect the fit, form, or function of the Equipment.
- d. **Changes in Pricing.** Harris reserves the right, in its acknowledgment, to change prices, terms, and specifications where necessary to reflect Harris' prices, terms, and specifications in effect on the date of the acknowledgment. Harris shall make no price adjustments during the Quote validity period or after Harris' acknowledgment of the Order unless Customer refuses to accept delivery when Harris is ready to ship. Upon any such change by Harris, Customer may elect to cancel the Order by written notice to Harris sent via certified mail within ten (10) days after Customer's receipt of the Order acknowledgement; if such timely written notice is not sent to Harris, then changes made by Harris in the Order acknowledgement shall be deemed accepted by Customer. In case of such cancellation, Harris will refund to Customer any advance payment made by Customer without interest or penalty. Harris may within a reasonable time reject any Order with or without cause. In no event shall Harris' silence be construed as acceptance; acceptance by Harris will occur only upon Harris' written acknowledgement of the Order. Harris' deposit or other disposition of funds paid by Customer with the Order shall not constitute acceptance of the Order. Upon Harris' rejection (or failure to accept within a reasonable time) of any Order, Harris will refund to Customer without interest or penalty any payment made by Customer with the Order.
- e. **Delays.** Delays in delivery of Equipment, Software or Services at Customer's request may give rise to a price increase by Harris prior to shipment or rendering of Services.
- f. **Contingent Orders.** Harris, in its sole discretion, may elect to accept Orders contingent upon (1) Customer's receipt of an FCC construction permit; (2) Customer's obtaining a financing commitment; or (3) another specified event. Any request for a contingent order must specifically state and designate one (1) of the three (3) types of permitted contingent Orders above. In the event that the contingency is resolved, Customer must immediately notify Harris in writing that the

Digital Television Transmitter System

contingency is resolved. Irrespective of the type of contingent Order designated by Customer, such contingency must be resolved as provided above and any amounts specified as payable must be received by Harris before Harris will start work or the delivery schedule will commence. If the designated event or action does not occur within sixty (60) days, upon giving prompt written notice to that effect to the other party, either party may cancel the contingent Order for all or part of the items ordered. Upon such proper cancellation Harris will, at its option, refund to Customer the payments made against the items being canceled or apply the funds to Customer's account.

g. **Changes.** Harris may, if possible and prior to delivery of the Order, review requests for changes to the Order. Acceptance of any changes requested by Customer shall be at Harris' reasonable discretion, and any changes may result in additional charges to Customer.

h. **Delivery.** Unless otherwise specified by Customer, Harris may ship in any manner convenient to Harris. The delivery date quoted by Harris, (the "Scheduled Delivery Date") is Harris' best estimate, is based upon conditions at the time of quotation and subject to availability of inventory and Customer's securing of financing. Harris shall exercise reasonable efforts to comply with Customer's requested shipping schedule if Customer furnishes all information necessary, including sufficient detail to complete the technical specifications, to permit Harris to complete the Order. Harris may make, and Customer agrees to accept, shipments in more than one lot; payment for each lot shall be due accordingly. In no event shall time be of the essence regarding the Scheduled Delivery Date.

(1) **Delay by Customer.** Customer agrees to take delivery of the Equipment, Software or Services (collectively, the "Goods") on the Scheduled Delivery Date. Customer may not delay delivery of the Goods without Harris' consent. If delivery of the Goods is delayed by Customer, Customer agrees to pay all costs associated with such delay, including without limit any storage expenses, and payments are to be made by Customer as though shipment had been made or Services performed as scheduled. Title and risk of loss for Equipment placed in storage shall pass to Customer upon placement of the Equipment into storage and the warranty will start on that date. If Customer delays delivery of the Goods for a period of more than ninety (90) days beyond the Scheduled Delivery Date, then Harris may cancel the Order by written notice to Customer. Upon any termination pursuant to this provision, Harris will be entitled, as a minimum, to all costs actually incurred up to the time of termination, plus a fair and reasonable pro rata profit on such cost. A termination notice containing these charges will be prepared and an invoice for termination charges will be submitted to Customer, which amounts will be due and payable upon receipt.

(2) **Delay by Harris.** If shipment of any Goods is delayed by Harris for more than ninety (90) days beyond the Scheduled Delivery Date, Customer may cancel the Order by written notice to Harris, whereupon Harris shall refund to Customer an amount equal to an equitable portion of any payment made by Customer towards the total price, without interest.

i. **Freight Charges.** Unless otherwise agreed in writing by the parties, all prices and terms are F.O.B. place of shipment and are exclusive of freight charges. Customer will pay for all shipping charges to Customer's destination and such charges will be added to the Harris invoices or paid directly by Customer. The method of shipment normally will be determined by Customer's Order, but if no carrier or method of shipment is specified Harris will select a carrier as a convenience to Customer.

j. **Transportation Insurance.** As a service to Customer on prepaid shipments from Harris' facilities, Harris will carry transportation insurance on the Equipment and Software while it is in transit within the continental United States. It is Customer's responsibility to inspect the received Goods in accordance with carrier's inspection requirements and report in writing within forty-eight (48) hours to the carrier and to Harris any shortages or damage. Failure to report shortages or damages promptly will negate this insurance and risk of loss or damage will be Customer's responsibility. Harris recommends that Customer also arrange Customer's own transit insurance for maximum protection against loss or damage.

k. **Title and Risk of Loss.** Title to and risk of loss for Equipment and Software media sold under this Agreement shall pass to Customer at the F.O.B. place of shipment, subject to Customer's rights with respect to any transit insurance purchased by Harris as provided above.

l. **Discontinued Availability/Last Time Buy.** Unless otherwise agreed in writing by the parties, Customer acknowledges that Harris has made no representation about the continued availability of the Equipment listed in any Order. Harris reserves the right, in its absolute discretion, with or without notice, without incurring any liability to Customer or otherwise, whether in contract or tort, to discontinue manufacturing or selling any of the Equipment listed in any Order at any time. Harris may, within its discretion, provide Customer with a limited time opportunity to purchase such quantities of the Equipment as Customer estimates it may need ("last time buy"). Customer's last time buy rights are limited to products available in Harris' inventory at the time of Customer's request.

3. Payment Terms, Taxes, Security Interest and Insurance

a. **Payment Terms.** Unless otherwise specifically stated in the Quote, all billed charges are due prior to shipment or delivery of the Goods or performance of the Services. An invoice delivered by facsimile machine or by electronic means will have the same effect as an original. All balances past due will be subject to an annual finance charge of the lesser of eighteen (18) percent or the highest rate permitted by law, and Harris may elect to suspend further deliveries under such Order and/or any other Order with Customer, and/or suspend warranty services until such past due payments are received. Where Harris is providing financing to Customer, shipments will not be made until all required security agreements and financing statements have been executed and approved by Harris.

b. **Taxes.** All prices are exclusive of all sales, use, excise, VAT, GST, withholding and other taxes, duties, or charges. Unless valid evidence of tax exempt status is provided by Customer, Customer will be liable and will indemnify Harris for all such taxes related to any Order.

c. **Security Interest.** As security for the full and prompt payment of all amounts and obligations owed by Customer to Harris hereunder, Customer grants to Harris a security interest in all Equipment supplied by Harris to Customer hereunder and all proceeds thereof (collectively "Collateral"). Such security interest is and shall continue to be a first-priority security interest in the Collateral whether by virtue of the priority accorded purchase-money security interests under the applicable Uniform Commercial Code (the "UCC") or otherwise. Customer shall take all actions Harris deems necessary or desirable to perfect such security interest and maintain its first priority. Customer irrevocably authorizes Harris to file financing statements and amendments thereto in such places as Harris deems necessary or desirable (without Customer's signature where permitted by applicable law). Upon request of Harris, Customer will execute and deliver to Harris a separate security agreement under which Customer grants to Harris a security interest in the Collateral, and any such separate security agreement shall control over any conflicting terms of this Agreement. If the Equipment will be inventory in Customer's hands, Customer agrees that Harris may notify others claiming security interests in Customer's inventory of Harris' purchase-money security interest prior to supplying any Equipment to Customer. If Customer fails to pay or perform when due any amount or obligation owing to Harris hereunder or if Customer becomes insolvent, is the subject of any bankruptcy or insolvency proceeding, then Harris may declare all amounts and obligations of Customer owing to Harris hereunder immediately due and payable and Harris shall have the rights and remedies of a secured party under the UCC.

d. **Insurance.** If Customer's Order involves deferred payments and Harris requires the same to protect its security interest, Customer shall furnish Harris evidence of Customer's insurance of Equipment against fire and extended coverage perils in an amount equal to the full value of the Equipment, with loss first payable to Harris as its interest may appear. Customer agrees to maintain such insurance until full payment shall have been made to Harris.

4. Technical Data and Invention

a. Unless specifically agreed to by Harris and identified and priced in the Quote as a separate item(s) to be delivered by Harris (and in that event, so identified and priced), the sale of Equipment, Software licenses and Services under this Agreement confers on Customer no right in, license under, access to, or entitlement of any kind to any of Harris' technical data including but not limited to design, process technology, software and drawings, or to any of Harris' inventions (whether or not patentable), irrespective of whether any such technical data or invention or any portion thereof arose out of work performed under or in connection with this Agreement, and irrespective of whether Customer has paid or is obligated to pay Harris for any part of the design or development of the Equipment, Software or Services.

b. Harris will not be obliged to safeguard or hold confidential any data whether technical or otherwise, furnished by Customer for Harris' performance of this Agreement unless (and only to the extent that) Customer and Harris have entered into a separate written confidentiality agreement.

c. Customer shall not violate Harris' copyright of documents or Software or without Harris' written permission disclose Harris' confidential or proprietary data to others.

5. Installation, Maintenance and Services

a. Except as otherwise expressly stated in this Agreement, Customer is responsible for the prompt installation and proper maintenance of all Equipment in accordance with Harris' instruction books and good engineering practice. Customer also shall employ sufficient technically qualified personnel and have available the proper equipment necessary for maintenance. Harris' warranty of Equipment furnished hereunder is conditioned on such prudent practices on Customer's part.

b. If this Agreement provides that Harris is to participate in the installation, Customer will (i) provide timely decisions and approvals to Harris, upon which Harris will be entitled to rely, (ii) make available to Harris, at no charge, all personnel, information, facilities, services, security, etc. reasonably required by Harris for the performance of the Services hereunder, and (iii) prepare the installation site as necessary for the installation of such Equipment, including without limit the installation of complete electrical systems for all Equipment such as AC mains, distribution panels and wiring, disconnect boxes, over-current protectors, surge eliminators, uninterruptible power supplies, and automatic voltage regulators. Project installation will commence when all necessary Equipment is delivered to the site. Prior to commencing the installation, building construction and modifications should be substantially complete with finished walls and floors, interior and exterior windows and doors, adequate lighting, functioning heating/cooling, completed electrical service, and telephone communications. The site shall be free of construction dust and paint overspray and unencumbered by tradesmen or their materials. Customer certifies that the building is an asbestos-free environment, and is free of other safety and health hazards to Harris personnel.

c. Harris is not responsible for work done by contractors or others not engaged by Harris. Harris will not be responsible for any installation materials not supplied by Harris, or other similar items that may be required to complete the installation. Any supplies or equipment necessary to complete the installation that are not on the acknowledged Order or an approved change order shall be Customer's responsibility. Harris does not assume liability for proper operation of Equipment it supplies from other vendors, beyond the standard warranties and terms offered by such third-party vendors. Harris does not guarantee that systems supplied by Harris will function correctly if third-party equipment is substituted for that specified in the acknowledged Order, or if Customer makes engineering change orders affecting the operation of the systems.

d. Unless otherwise specified in this Agreement, Harris is not responsible for installation and inspection of any equipment or systems not supplied by Harris or any additions after the price for Services has been set in the Quote. Additional labor requirements beyond the scope of work statement set forth in the Quote will require prior approval from Harris, and such changes may result in additional charges.

e. Harris, in its sole discretion and without notice, may utilize subcontractors, Affiliates and/or other third parties to perform Service under an Order.



6. Equipment Return Policy

No Equipment may be returned without Harris' prior authorization and Customer agrees not to return any Equipment without such return authorization. Upon authorization, Harris will issue an authorization number, which number must appear on each individual package being returned. Harris may refuse shipments of Equipment returned without return authorization numbers. All Equipment being returned for credit must be returned within thirty (30) days from receipt and in good condition. Harris will inspect all Equipment returned. If there is damage, wear and tear, or if there are missing components or accessories, Harris will charge Customer for repair/refurbishment of the returned Equipment in addition to the basic restocking fee (if applicable). All questions regarding the Harris Product Return Policy must be directed to the appropriate Harris Technical Support Department. Customer will (i) package and pack the Equipment being returned in a manner which is in accordance with good commercial practice and adequate to insure safe arrival of such Equipment at the named destination; and (ii) insure the Equipment being returned for the full invoice amount. Harris will authorize the return of Equipment as follows:

a. Equipment Damaged in Shipment. Upon receipt of shipments, Customer must open and inspect all boxes immediately for possible freight damage. If damage is found, Customer must notify the delivering carrier within forty-eight (48) hours and request an inspection. After notifying the freight carrier, Customer shall promptly contact Harris for further instructions.

b. Items Shipped in Error. If Customer receives Equipment not included on the Order, Customer will promptly notify the Harris Order Administration Department responsible for the fulfillment of the Order. Equipment shipped in error is not subject to restocking fees provided it is returned without damage and in complete and unused condition. Harris will pay for the costs of return shipping.

c. Defective Equipment. If the Equipment Customer receives is defective, it is covered under the Harris or manufacturer's standard equipment warranty. Upon discovery of a warranty problem, Customer must promptly contact the appropriate Harris service center for warranty support. Customer agrees not to return the Equipment until a service representative has issued a return authorization, including a form Customer must fill out describing the nature of the Equipment defect.

d. Other Reasons. If Customer needs to return Equipment for reasons other than those specified in subsections 6.a through 6.c above, Harris' customer service representative will require a clear statement of the reason for the return request. Upon approval of Customer's request, which approval will be at Harris' sole discretion, a return authorization will be issued and restocking charges may apply and Customer will be responsible for paying for all shipping costs.

CUSTOM MANUFACTURED OR SPECIAL ORDER ITEMS ARE NOT RETURNABLE. Excess components and materials used during Harris systems installation will be evaluated on a case-by-case basis.

7. Licenses

a. Materials License. Harris hereby grants to Customer a non-exclusive, non-transferable (except as expressly provided in this Section 7 or in Section 12.h hereof) license to use Harris' proprietary documents, including schematics, drawings and user, installation, repair, maintenance, and technical manuals ("Licensed Harris Materials") solely in connection with the use of the Equipment purchased by Customer. Customer may not rent, lease, assign, transfer, network, display, or distribute the Licensed Harris Materials except as specifically provided herein or in the third party license terms.

b. Software License. Subject to the terms and conditions of this Agreement, Harris hereby grants to Customer a non-exclusive, non-transferable (except as expressly provided in this Section 7 or in Section 12.h hereof) license to use the Software identified on the Quote (the "Licensed Programs") for Customer's ordinary internal business activities and only in connection with the use of the Equipment purchased by Customer and on which the Licensed Programs were originally installed. The Licensed Programs furnished with the Equipment shall be Harris' latest commercial generation available at the time of shipment of the Equipment, and Harris shall be under no obligation to supply updates to such Licensed Programs except where so stated in writing. The terms and conditions of the licenses granted herein shall apply to any and all upgrades, enhancements, updates and modified versions of the Licensed Programs which may be provided by Harris to Customer in connection with this Agreement. Harris may provide such versions of the Licensed Programs via electronic download or on media, such as CDs or diskettes. If required by Harris, Customer agrees to substitute such version for the previous version being used with the Equipment and to delete and destroy any previous version and all copies thereof. The licenses granted herein to the Licensed Programs exclude the use of any functionality resident in the software application, unless specifically identified in the Order. Customer agrees to not use any functionality which is not specifically identified in the Order without first adding such to the license with Harris' written consent. Customer may copy machine-readable Licensed Programs to the extent reasonably necessary for normal use with the Equipment. All originals and copies of the Licensed Harris Materials and Licensed Programs shall be and shall remain the property of Harris. Customer may not rent, lease, assign, transfer, network, display, or distribute the Licensed Harris Materials or Licensed Programs except as expressly provided herein, as permitted by the options selections contained within the Licensed Programs or by applicable third-party licenses, Customer may not copy, reverse engineer, disassemble, decompile, modify, alter, translate, or adapt the Licensed Programs or any copy, adaptation, transcription or merged portion of the Licensed Program, nor create any derivative thereof. Customer will not cause any copyright, identification labels or legal notices contained within the Licensed Programs to be modified, removed, suppressed, or in any other way made inconspicuous. Except as may be expressly provided herein, no service bureau work, multiple user license or time sharing arrangement is permitted and no right is granted herein to any third party to use the Licensed Programs, to Customer to use the Licensed Programs for any third party or to Customer to utilize the Licensed Software for any purpose whatsoever not described herein. In the event of a violation or threatened violation of the license granted herein, Harris will be entitled to seek injunctive relief.

c. Third-Party Software. In addition to the Licensed Programs, other software or documentation provided by Harris may



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originate from third party licensors ("Licensed Third Party Programs"), and may require that the terms of such licensors' respective licenses be accepted prior to use. Such license terms, if any, are either attached or will appear as a part of the delivered or downloaded software and must be accepted by Customer prior to installation of the Licensed Third Party Programs. Third party licensors shall be deemed to be third party beneficiaries with respect to any Licensed Third Party Programs. The terms of the third party licenses shall be controlling with respect to any Licensed Third Party Programs provided under any Order.

d. Intellectual Property Rights. The Licensed Programs and all trademarks, trade secrets, patents, copyrights, other intellectual property rights and other confidential or proprietary information contained therein are and will remain the sole and exclusive property of Harris or its licensors. Neither party may use the other party's or its licensors names or trademarks without prior written approval. Any rights granted hereunder take the form of a license. Customer shall label each copy of the Licensed Harris Materials and Licensed Programs with the copyright, trademark, and proprietary notices, in the same form, which appear on the Licensed Harris Materials and Licensed Programs delivered to Customer by Harris. Customer shall not remove, alter or destroy any existing copyright, trademark, and propriety notices which appear on any Licensed Harris Materials and Licensed Programs. All copies of the Licensed Harris Materials and Licensed Programs, when not in use, shall be destroyed or maintained in a secure place within Customer's business premises under access and use restrictions compatible with this Section 7. Customer shall be deemed to own only the magnetic or other physical media in which the Licensed Programs (original and all copies) are recorded.

e. Term of Licenses. The term of the licenses to the Licensed Harris Materials and Licensed Programs shall be coterminous with Customer's ownership of the Equipment, subject to early termination by Harris upon notice to Customer in the event of a material breach of the terms of this Agreement. The term of the license to any Licensed Third Party Programs may be different. Upon any such termination, Customer shall immediately discontinue use of the Licensed Harris Materials and Licensed Programs, shall comply with the terms of the license applicable to the Licensed Third Party Programs, and in the case of any termination (other than a permitted transfer to a subsequent owner), promptly shall return to Harris all copies of the Licensed Harris Materials (if any) and Licensed Programs. In the event of non-payment by Customer, Harris reserves the right to deactivate or remove the Software.

f. Confidentiality of Licensed Harris Materials and Licensed Programs. Customer shall keep the Licensed Harris Materials and Licensed Programs confidential by affording access to such only to those of Customer's employees, agents, or consultants having a need to know and shall require such individuals agree in writing to the obligations contained herein. In addition, Customer shall employ reasonable measures to prevent any unauthorized use, copying, publishing, reproduction, or disclosure of the Licensed Harris Materials and Licensed Programs and shall not treat such with lesser care than Customer's own confidential information. Customer shall not make copies of the Licensed Harris Materials without the prior written permission of Harris.

g. Distribution. Harris may incorporate and distribute products licensed under several third party licenses that require the distribution of some sections of source code, object code or the like. Accordingly, Harris will distribute these sections to the parties required by the applicable third party license(s) upon request at no more than maximum price allowable under those license(s). This offer is valid for the minimum time period required by the applicable third party license(s).

h. Violation of Licenses. Customer agrees that a violation of the license terms would cause irreparable injury to Harris or the third party licensor, and that Harris or the third party licensor, as a third party beneficiary, shall be entitled, in addition to any other rights and remedies it may have, at law or in equity, to an injunction enjoining and restraining Customer from doing or continuing to do any such act and any other violations or threatened violations of the licenses granted herein.

8. Warranties

a. Standard Equipment Warranties. Unless otherwise provided by Harris in writing, Harris warrants that all Harris Broadcast Communications-manufactured Equipment will be free of any defect in materials or workmanship for the period of time specified in table 8.a below (the "Equipment Warranty Period"); such period is measured from the date of shipment from a Harris facility. This warranty is extended to Customer and applies to all Harris Broadcast Communications-manufactured Equipment purchased, installed, and used for the purpose for which such Equipment was originally designed.

Table 8

<u>Product Family</u>	<u>Standard Warranty Period</u>
Transmitters (except Platinum VHF Transmitters)	15 months from shipment
Storage, Servers, Automation, Graphics, Networking, Post Production, Consoles & Audio Management Equipment	15 months from shipment
Test & Measurement, Routing & Distribution Equipment	27 months from shipment
Digital Exciters (Radio)	39 months from shipment
Platinum VHF Transmitters	63 months from shipment
B-Stock Equipment	Same as applicable product warranty
Equipment Sold as Resale	As provided by Manufacturer
Replacement Parts – within Standard Warranty Period	Longer of (i) applicable product warranty or (ii) 90 days from shipment
Replacement Parts – Post Standard Warranty Period	90 days from shipment



b. Remedy for Breach of Equipment Warranty. Upon notice of a breach of the Equipment warranty provided in Section 8.a above, Customer's sole and exclusive remedy will be, at Harris' sole discretion and option, repair or replacement of the defective Equipment in accordance with the column titled "Standard Equipment Warranty" of Table 9 below. Components that Customer claims to be defective must be available to Harris for inspection and testing. Unless otherwise agreed in writing, customs clearance for all replacement parts under the warranty or otherwise will be Customer's sole responsibility. To be entitled to rights under the Standard Equipment Warranty, Customer must notify Harris in writing within thirty (30) days after discovering a suspected defect in any Equipment, but in any event prior to the expiration of the applicable Standard Warranty Period. Notice to a Harris dealer, systems integrator, sales representative or other third party is not notice to Harris. Following its receipt of any such Customer notice, Harris will determine whether the reported problem is covered by this Standard Equipment Warranty. If Harris determines that the problem is covered, Harris will authorize return or repair of the defective Equipment, as deemed appropriate by Harris in its sole discretion.

c. Equipment Warranty Exclusions: Harris does not warrant, guarantee and is not responsible for:

- (1) Defects, failures, damages or performance limitations caused in whole or in part by (A) power failures, surges, fires, floods, snow, ice, lightning, excessive heat or cold, highly corrosive environments, accidents, actions of third parties, or other events outside of Harris' control, or (B) Customer's abuse, mishandling, misuse, negligence, improper storage, servicing or operation, or unauthorized attempts to repair or alter the Equipment in any way. Customer must provide qualified technical personnel to maintain and repair the Equipment.
- (2) Equipment built to Customer's specifications that is later found not to meet Customer's needs or expectations.
- (3) The performance of the Equipment when used in combination with equipment not purchased, specified, or approved by Harris.
- (4) Signal coverage delivered by antenna equipment whether or not supplied by Harris.
- (5) Cost to ship Equipment to and from Harris to provide the repair, replacement, or return of a defective part or unit.

d. Additional Warranty Notes.

- (1) OEM or Third Party equipment that is incorporated into Harris Equipment is covered for the same period as such Harris Equipment's standard product warranty unless the OEM or Third Party equipment carries its own limited warranty;
- (2) Items Sold As Resale. Items sold as resale are such items that are not manufactured by Harris but may be utilized in conjunction with or independently of Harris manufactured Equipment (such as tubes, printers and antenna transmission lines) and shall be covered only by the specific warranty terms of the supplier or original equipment manufacturer of those items. IF AN ORDER COVERS EQUIPMENT NOT OWNED BY HARRIS, IT IS SOLD SUBJECT TO HARRIS' ACQUISITION OF POSSESSION.
- (3) B-Stock Equipment. B-Stock Equipment for non-transmitter related Equipment is defined as any non-out-of-production product that is less than three (3) years old. B-Stock Equipment related to transmitters is defined as equipment repurchased by Harris that is reconditioned or refurbished for sale to a second generation owner by Harris or its reseller.
- (4) Used Equipment. IF THE EQUIPMENT SPECIFIED IN AN ORDER IS DESCRIBED AS USED, IT IS SOLD "AS IS" AND WITH NO WARRANTY.

e. Standard Services Warranty. Harris warrants that the Services will be performed in a professional manner (the "Services Warranty"). Notice of a breach of the Services Warranty must (i) specify in reasonable detail, the nature of the claim, and (ii) be received within ninety (90) days from the last day of performance of the Services. Upon notice of a breach of the Services Warranty and Harris' determination of the validity of such breach of the Services Warranty, Harris will reperform the applicable Services at Harris' expense. If after reasonable opportunity Harris is unable to reperform such Services to the reasonable satisfaction of Customer, Customer may, as its exclusive remedy, obtain a refund of the fees paid to Harris under the applicable Order for such Services.

f. Software Warranties.

- (1) Physical Media. Harris warrants all physical media ("software media") for the Licensed Programs, including without limit custom software and traffic translators, to be free of defects in material or workmanship for a period of ninety (90) days from the date of completed installation, or if Customer should assume responsibility for installation of the Software, for a period of ninety (90) days from the date of shipment of the Licensed Programs by Harris (the "Software Warranty Period"). This limited warranty extends only to Customer as the original licensee. Customer's sole and exclusive remedy under this limited warranty will be, at Harris' option, repair or replacement of the software media.
- (2) Licensed Programs. Harris warrants that during the Software Warranty Period the Licensed Programs shall operate substantially in compliance with Harris' specifications for the Licensed Programs (the "Software Warranty"). The entire liability of Harris under this limited warranty is to provide, free of charge, a corrected copy of any portion of the Licensed Programs which is found by Harris inspection not to be in substantial compliance with its specifications. If Harris is unable to provide a corrected copy of the Licensed Programs within a reasonable time, Harris will replace the same with a functionally similar program or refund to Customer the amounts Customer paid Harris to purchase or license such Licensed Programs. Harris does not warrant that such Programs are error free or that Customer will be able to operate such Programs without problems or



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interruptions. Corrections to the Licensed Programs beyond the Software Warranty Period will only be made by Harris pursuant to a software maintenance agreement (attached to this Agreement, if any). The software maintenance agreement does not cover hardware replacement, hardware upgrades or emergency service for hardware; an expanded software maintenance agreement is required for such.

(3) Cost of Corrections. During the Software Warranty Period, Harris will bear the material cost and shipment of corrected or replacement Software at no charge to Customer. Software corrections will be sent via e-mail. In the rare event Customer requires a Harris customer support engineer to visit the site, related reasonable pre-approved on-site time and travel expenses will be billed at the prevailing daily rates, unless otherwise agreed to in writing prior to the visit. A ONE-DAY MINIMUM CHARGE APPLIES TO ALL ON-SITE VISITS.

(4) Software Warranty Exclusions. The Software Warranty does not apply to any software media or Licensed Program that (A) has been altered or modified, except by Harris; (B) has not been installed, operated, repaired, or maintained in accordance with instructions supplied by Harris; (C) has been subjected to abnormal physical or electrical stress, misuse, negligence, or accident; or (D) is used in ultra-hazardous activities.

9. Warranty Services; Extended Warranty Terms

The Services provided by Harris under the Standard Equipment Warranty are described in the column titled "Standard Equipment Warranty". In addition, Customer may elect to purchase (i) upgraded warranty Services during the Equipment Warranty Period, or (ii) extended warranty Services following the Equipment Warranty Period. In the event that any upgraded or extended warranty services for specific Harris Equipment ("Extended Warranty Support Agreement") are included on any Quote and/or Order, the terms and conditions of this Section 9 shall apply. Any Quote and/or Order must state the specific Extended Warranty Support Agreement as indicated below. The warranty Services outlined in the Table 9 below are further described in subsections 9.a through 9.k below.

Table 9

	Standard Equipment Warranty	Upgraded and Extended Warranty Support Agreements			
		Helpdesk	Basic	Gold	Site
9x5 Technical Phone Support - Region	√		√		
After-hour emergency "Down or Off Air" Support	√		√		
24x7 Technical Phone Support		√		√	√
Emergency Field Services	√	√	√	√	√
Software Updates & Bug Fixes (not Automation Software)	√	√	√	√	√
Technical Knowledge Bank – access	√		√	√	√
Advance Exchange Parts – 5-day shipment	√		√		
Advance Exchange Parts – Next day shipment				√	√
RemoteDial-up Support – Bank of Hours				40 hours	√
Annual Software License Fees – 10% discount		√		√	√
Yearly Onsite Preventive Maintenance Visit				Option	√
Online Order Status & Reports					√
Bi-Annual Site Review and Evaluation					√
Consigned Inventory					Option
Dedicated Site Advocate					Option

a. Technical Support.

(1) 9X5 Technical Phone Support, Plus Emergency After-Hours Support. Technical phone support will be provided by Harris during business hours, nine (9) hours per day, five (5) days per week, Monday through Friday. This 9X5 coverage shall include a live representative answering the phone and providing technical phone support for the Equipment, but does not imply that a dedicated representative will be assigned to or available for Customer. Such technical phone support will be provided on a priority basis, with the same priority as technical phone support for Harris' warranty customers and ahead of technical phone support for Harris' non-warranty, non-Extended Warranty Support customers. In addition, telephone "hotline" support will be provided by Harris in the event of a "Severity 1" emergency affecting the Equipment which occurs outside of the regular 9x5 technical phone support hours herein described ("Emergency After-Hours Hotline Support"). A "Severity 1" emergency indicates a condition which impacts Customer's operations such that Customer is, or is in imminent danger of being, "off-air" and/or unable to broadcast due to a manufacturing defect in the materials or workmanship of the Equipment. Emergency After-Hours Hotline Support does not imply that a dedicated representative will be assigned to or available for Customer. When Customer contacts Harris' Technical Support Call Center, the Harris representative answering the call will classify the call, determine the severity level, and respond accordingly. If the Harris representative determines during an after-hours call, in his or her

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reasonable discretion, that the described condition does not represent a Severity 1 emergency, the representative will log the call for a return call the next business day during Customer's business hours. (2) 24X7 Technical Phone Support. Technical phone support will be provided by Harris twenty-four (24) hours per day, seven (7) days per week. This 24X7 coverage shall include a live representative answering the phone and providing technical phone support for the Equipment, but does not imply that a dedicated representative will be assigned to or available for Customer.

For clarification purposes, any technical support provided by Harris will be for the sole purpose of fulfilling Harris' warranty obligations. If Harris determines that Customer is using technical support as a substitute for training of Customer's personnel, then such technical support will be subject to additional charges at Harris' then prevailing unit rate for such services.

- b. Emergency Field Services: At Harris' option, field services may be provided to Customer if a reasonable effort by Customer's qualified technical personnel has not corrected a problem. In such event, Customer will be responsible for the travel and living expenses associated with the field service of Harris' personnel.
- c. Software Updates and Bug Fixes (not Automation Software): Under the terms of an Extended Warranty Support Agreement, Customer may download applicable software updates or bug fixes for Harris Equipment from Harris' software website. This feature entitles Customer to non-chargeable software updates and bug fixes for software which pertains to, relates to or resides on Harris Equipment, solely for the purpose of operation of such Equipment; new feature sets or functionality that are considered "upgrades", or any future features or software applications are not included.
- d. Access to Technical Knowledge Bank. Under the terms of an Extended Warranty Support Agreement, Harris provides access to additional documentation and a frequently asked questions knowledge bank in a restricted-access area on its website (collectively, the "Technical Knowledge Bank"). Customer shall have priority access to the Technical Knowledge Bank and the content thereof that is applicable to the Equipment, and may access the Technical Knowledge Bank electronically twenty-four (24) hours per day, seven (7) days per week. The content of the Technical Knowledge Bank is by no means complete, and if in doubt, Customer should contact a technical phone support representative prior to implementing any Equipment modification or taking any other action.
- e. Advance Exchange Program. Under the Advance Exchange Program, subject to the terms and conditions set forth below, Harris will ship replacement Equipment (or part thereof), in advance, from a service center in exchange for Customer's defective Equipment (or part thereof). Only Equipment (or parts thereof) that have discrete identifiable serial numbers and/or that contain serialized modules that can be shipped as a complete module are eligible for the Advance Exchange Program. Eligibility of or shipment times for out-of-production Equipment or legacy Equipment may also be affected by availability of exchange Equipment (or parts thereof). Subject to availability of stock on hand, Harris shall use commercially reasonable efforts to have Advance Exchange Equipment (or part thereof) with the same model number as the defective Equipment (or part thereof) ready to ship via an express carrier selected by Harris within the time period specified in the table above, depending on the time of Customer's call. Except as otherwise provided herein, Harris shall pay delivery charges of the Advance Exchange Product (or part thereof) to Customer, and Customer shall pay for return shipping of the defective Equipment (or part thereof) to Harris. Harris will use commercially reasonable efforts to supply Equipment (or part thereof) from the geographical region of Customer's site, so as to minimize freight and duty, however, in some cases, Equipment (or part thereof) may be shipped from another country, in which case freight and duty are the sole responsibility of Customer. Harris bears the risk of loss or damage while the Equipment (or part thereof) is in transit to Customer from the Harris Service Center, and Customer bears the risk of loss or damage while the Equipment (or part thereof) is in transit back to the Harris Service Center.
- (1) Exchange Requirements. Upon receipt of an Advance Exchange Product, Customer has thirty (30) days to tender the defective Equipment (or part thereof) to the return carrier for shipment to the service center designated by Harris. If Customer does not timely return the defective Equipment (or part thereof), Harris shall invoice Customer for the List Price of such Equipment (or part thereof). Such failure to return the Equipment (or part thereof) may, in Harris' discretion, be grounds for termination of the Extended Warranty Support Agreement and/or suspension of any future Advance Exchange privileges until such outstanding defective Equipment has been returned.
- (2) Exchange Products. Under the Advance Exchange Program, Harris will provide Customer with new, rebuilt, refurbished or alternate Equipment (or part thereof) of equal or improved quality, as exchange Equipment (or part thereof) to replace eligible defective Equipment (or part thereof). Any alternate Equipment (or part thereof) will meet or exceed the specifications of the replaced Equipment (or part thereof). Rebuilt or refurbished Equipment may bear cosmetic blemishes that do not affect performance. Unless otherwise specified by Harris in writing, repaired or replaced Equipment (or parts thereof) are covered only for the remainder of the term of the applicable Extended Warranty Support Agreement. All Equipment (or parts thereof) replaced by Harris with Advance Exchange Equipment (or part thereof) become the property of Harris.
- (3) Exclusions. Harris has no obligation to (i) service, exchange or otherwise replace any Equipment (or part thereof) that has been damaged, modified, abused, misused or over-used as determined by Harris or has been used with non-Harris supplies or products that have caused damage or malfunction; (ii) paint, refinish, refurbish, restore or exchange any Equipment (or part thereof) with cosmetic blemishes; (iii) service, exchange or otherwise replace any Equipment (or part thereof) if the same would interfere with, impede or be redundant with normal or scheduled maintenance of such Equipment (or part thereof); (iv) service, exchange or otherwise replace any Equipment (or part thereof) that is within sixty (60) days of the end of its production life; or (v) provide any application software support or service involving application hardware or replace any accessories. If Harris elects to perform any such services at Customer's request, then such services will be deemed a



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service call and all labor, parts and materials used for the service call will be charged at Harris' then-prevailing rates.

(4) Ordering. To make a request for an Advance Exchange under this Agreement, Customer must follow the ordering procedures specified in Section 9.I. Prior to dispatch of an Advance Exchange Equipment (or part thereof), a Harris Technical Support Engineer must determine that defective eligible Equipment (or part thereof) is the cause of the malfunction and that it must be replaced.

f. Remote Dial-Up Support – Bank of Hours. Under the terms of certain Extended Warranty Support Agreement, Harris will provide Customer with a bank hours of remote dial-up technical support ("Remote Dialup Support") to be used in responding to Customer's requests for such support. Remote Dial-Up Support may include remote diagnosis of problems with the Equipment, remote repairs and similar remote assistance, but excludes monitoring (unless specifically requested by Customer), regular maintenance and any onsite visits. Remote Dial-Up Support requires specific agents, software or applications to be loaded onto the Equipment that allow Harris' Technical Support Team to dial-in to Customer's facility to provide technical support. Customer hereby consents to such remote access and dial-in. The logistics and parameters of such dial-in will be determined by mutual agreement of the parties. During the term of this Agreement, Customer may elect to purchase an additional bank of hours of Remote Dial-Up Support at Harris' then prevailing rates.

g. 10% Discount off Annual Software License Fees. Under the terms of a Gold Extended Warranty Support Agreement, Customer shall be entitled to receive a ten (10) percent discount off of any annual software licensing fees charged by Harris with respect to new Equipment (except Automation Equipment), including any new Harris software applications or upgrades that are added to existing Equipment covered by a Extended Warranty Support Agreement.

h. Annual Onsite Preventative Maintenance Visits. During each year of the term of certain Extended Warranty Support Agreements, Customer may utilize one (1) annual onsite visit by a Harris field engineer to Customer's facility on a mutually agreeable date (scheduled at least one (1) month in advance) to perform a routine Equipment inspection and preventative maintenance review of the Equipment (an "Annual Onsite Preventative Maintenance Visit"). Customer must contact Harris' Technical Support Order Desk at least one (1) month in advance to schedule such a visit and Customer is entitled to only one (1) such visit in any twelve (12) month period during the term of this Agreement. Customer is not entitled to any refund in the event that Customer fails to schedule such a visit in any year. In the event that Harris agrees, at Customer's request, to make more frequent visits, such visits shall be charged at Harris' then-prevailing rates. Annual Onsite Preventative Maintenance Visits exclude actual travel and lodging expenses, which will be billed separately and paid by Customer. Annual Onsite Preventative Maintenance Visits are intended to provide only routine Equipment inspection (including troubleshooting support) and a preventative maintenance review and cannot be used for any installation, commissioning or enhancement of the Equipment. These visits also exclude the cost of any replacement Equipment (or parts thereof) or repair services that may be recommended or required, as well as any associated installation costs. Should a Harris field engineer make any recommendations during an onsite visit, Harris has no obligation to perform such repairs or installation unless mutually agreed by the parties, and subject to payment of Harris' then-prevailing rates. Customer shall provide reasonable access to the Equipment onsite for Harris field engineers.

i. Bi-Annual Site Review and Evaluation. Site Review and Evaluation services is provided on a bi-annual basis. This service brings an on-site field engineer to the Customer's facility to provide a review of the Harris products installed in one (1) facility. This review will provide Customer with an evaluation of the condition of their Harris products, and recommendations as to the performance of the products. The on-site field engineer will make recommendations to Customer about possible updates and/or upgrades that could improve the system efficiency and/or performance of the Harris products. Should any work be required, the parties must schedule a time for the work to be performed and additional charges will be incurred.

j. Consigned Inventory (Option). This option is available under a Site Extended Warranty Support Agreement and is a custom feature that will be defined around specific requirements of Customer. Consigned inventory is managed and held at the Customer facility and becomes an extension of Customer's inventory. For clarification purposes, any Order that includes the Consigned Inventory option must include additional mutually agreed upon terms and conditions.

k. Dedicated Site Advocate (Option). This option is available under a Site Extended Warranty Support Agreement and is defined by a separate Statement of Work mutually agreed upon by the parties.

l. Ordering. To make a request for an Advance Exchange, implementation of Remote Dial-Up Support, an Annual Onsite Preventative Maintenance Visit, or other assistance under a Extended Warranty Support Agreement, Customer must contact Harris' Technical Support Order Desk at 1-888-HARRIS6, identify itself as a Extended Warranty Support customer, and provide the contract # or the serial number of the Equipment, as applicable.

m. Other Support. No Extended Warranty Support Agreement provides troubleshooting, software consulting or technical support coverage beyond that which is described in this Section 9. If Harris does provide any such other services, Harris' then-prevailing rates shall apply.

10. Warranty Disclaimer; Limitations of Liability

a. EXCEPT AS EXPRESSLY PROVIDED IN THIS AGREEMENT, HARRIS HEREBY EXPRESSLY DISCLAIMS ALL REPRESENTATIONS, CONDITIONS AND WARRANTIES, WHETHER EXPRESS OR IMPLIED, INCLUDING BY WAY OF EXAMPLE AND NOT LIMITATION, THE IMPLIED WARRANTIES OF TITLE, MERCHANTABILITY, NON-INFRINGEMENT AND FITNESS FOR A PARTICULAR PURPOSE.

b. NOTWITHSTANDING ANYTHING HEREIN TO THE CONTRARY, IN NO EVENT WILL HARRIS BE LIABLE FOR ANY SPECIAL, INCIDENTAL, PUNITIVE OR CONSEQUENTIAL DAMAGES WHATSOEVER, INCLUDING LOSS OF PROFITS, WHETHER ARISING IN CONTRACT, TORT, WARRANTY OR OTHERWISE, EVEN IF IT HAS BEEN

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ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. THE LIMITATIONS SET FORTH HERE WILL APPLY EVEN IF THE REMEDIES OF ERROR CORRECTION, REPERFORMANCE OF SERVICES AND REFUND OF PAYMENTS COMPLETELY FAIL OF THEIR ESSENTIAL PURPOSE.

c. NOTWITHSTANDING ANYTHING HEREIN TO THE CONTRARY, THE LIMIT OF HARRIS' LIABILITY (WHETHER IN CONTRACT, TORT, NEGLIGENCE, STRICT LIABILITY, BY STATUTE OR OTHERWISE) TO CUSTOMER OR TO ANY THIRD PARTY CONCERNING THE HARRIS EQUIPMENT OR SOFTWARE LICENSES SOLD TO CUSTOMER UNDER THIS ORDER, HARRIS' PERFORMANCE OR NON-PERFORMANCE, OR IN ANY MANNER RELATED TO THIS AGREEMENT, FOR ANY AND ALL CLAIMS WILL NOT IN THE AGGREGATE EXCEED THE ACTUAL SALES PRICE PAID BY CUSTOMER DURING THE TWELVE (12) MONTH PERIOD IMMEDIATELY PRECEDING THE DATE OF THE APPLICABLE CLAIM FOR THE SPECIFIC EQUIPMENT, SOFTWARE OR SERVICES PURCHASED UNDER THIS ORDER THAT ARE THE SUBJECT OF THE CLAIM.

11. Indemnification

a. Harris will defend Customer against any third-party claim that any Equipment or Licensed Program infringes a U.S. patent, copyright, trademark, or trade secret. If any Equipment or Licensed Program is, or in Harris' opinion is likely to be, held to constitute an infringing product, Harris will, at its expense and option either, (i) procure the right for Customer to continue using such Equipment and/or Licensed Programs, (ii) modify the Equipment and/or Licensed Programs to make it non-infringing, or (iii) accept return of the Equipment and/or Licensed Programs and replace the same with substantially equivalent non-infringing Equipment and Software. If Harris is unable to reasonably accomplish one of the foregoing, Harris may then direct the return of the offending portion of the Equipment and/or Licensed Programs and provide to Customer a pro-rata refund of the original purchase price for such portion of the Equipment and/or Licensed Program. Harris will have no obligation to indemnify Customer, however, if the claim of infringement is caused by (i) any Equipment, Licensed Program, or portion thereof, manufactured to specifications furnished by Customer or on Customer's behalf, or in accordance with industry standards, (ii) Customer's failure to use corrections or enhancements made available by Harris, (iii) Customer's use of the Equipment and/or Licensed Program in combination with any product not owned, developed or approved in writing by Harris, (iv) the use of such Equipment and/or Licensed Program in combination with other equipment or software not furnished by Harris, (v) the use of such Equipment and/or Licensed Program in a manner not normally intended by Harris, (vi) any patent, copyright, trademark or trade secret in which Customer, or any of Customer's affiliates has a direct or indirect interest. THE FOREGOING REMEDIES CONSTITUTE CUSTOMER'S SOLE AND EXCLUSIVE REMEDIES AND HARRIS' ENTIRE LIABILITY WITH RESPECT TO INFRINGEMENT.

b. Each party will indemnify and hold harmless the other party, its employees and agents, from and against any claims, demands, loss, damage or expense relating to bodily injury or death of any person or damage to real and/or tangible personal property to the extent proximately caused by the negligence or willful misconduct of it, its personnel or agents in its performance hereunder.

c. To receive the foregoing indemnities, the party seeking indemnification must notify the other in writing of a claim or suit promptly and provide it with reasonable cooperation (at the indemnifying party's expense) and full authority to defend or settle the claim or suit. Neither party will have any obligation to indemnify the other for any settlement made without its written consent.

12. General Provisions

a. Applicable Law, Venue and Jurisdiction. This Agreement, and any disputes related hereto, shall be governed by and interpreted in accordance with the laws of the State of Florida, USA, regardless of any law principles requiring the application of any other law. The parties agree that the exclusive venue for any action related to the dispute or interpretation of this Agreement shall be in the courts with the appropriate jurisdiction located in Orlando, Florida, and each party irrevocably submits to the jurisdiction of each such court in any such action and waives any objection it may now or hereafter have to venue or personal jurisdiction in each such court. The prevailing party in any action related to the dispute or interpretation of this Agreement shall be entitled to recover its reasonable attorneys fees incurred in pursuing the action, including those fees incurred throughout all bankruptcy and appellate proceedings.

b. Jury Waiver. THE PARTIES FURTHER AGREE, TO THE EXTENT PERMITTED BY LAW, TO WAIVE ALL RIGHTS TO A TRIAL BY JURY OF ANY ACTION RELATING TO THE DISPUTE OR INTERPRETATION OF THIS AGREEMENT, WHETHER SOUNDING IN CONTRACT, TORT, OR OTHERWISE. THE PARTIES SPECIFICALLY ACKNOWLEDGE THAT THIS WAIVER IS MADE KNOWINGLY AND VOLUNTARILY AFTER AN ADEQUATE OPPORTUNITY TO NEGOTIATE ITS TERMS.

c. Excusable Delay.

(1) Harris will be excused from performance under this Agreement and not be liable to Customer for delay in performance attributable in whole or in part to any cause beyond its reasonable control, including, but not limited to, actions or inactions of government whether in its sovereign or contractual capacity, judicial action, war, civil disturbance, insurrection, sabotage, act of public enemy or terrorism, labor difficulties, failure or delay in delivery by Harris' suppliers or subcontractors, transportation difficulties, shortage of energy, materials, labor or equipment, accident, fire, flood, storm or other act of nature, Customer's fault or negligence or where compliance with any applicable environmental law or regulation by Harris is not reasonably technologically or economically feasible, or would otherwise require Harris to change its manufacturing process.

(2) In the event of an excusable delay, Harris will make reasonable efforts to notify Customer of the nature and extent of such delay and (i) Harris will be entitled to schedule an extension on at least a day-to-day basis, and (ii) if the delay is caused by Customer's fault or negligence, Harris will be entitled to an equitable adjustment in price under this Agreement.

Digital Television Transmitter System

- d. Export and Re-Export Restrictions. Customer acknowledges that the Equipment, Licensed Programs and Services sold or licensed to it by Harris under this Agreement may be subject to export controls under the laws of the United States or Canada. Customer will not export or re-export the Equipment or Licensed Programs, technology, or products manufactured from the technology that are the subject of this Agreement in violation of the export control laws of the United States or Canada. Customer shall defend, indemnify and hold Harris harmless from and against any loss, damage, or liability arising out of Customer's failure to comply with this Section.
- e. Compliance with Waste Recycling Laws. Customer acknowledges and agrees that the supply of the Equipment by Harris to Customer, and the resale or re-supply of the Equipment by Customer, may give rise to obligations for Harris and Customer under the Environmental Laws as hereinafter defined. Customer shall be responsible for the collection, recycling, reuse and disposal of the Equipment in compliance with the Environmental Laws. "Environmental Laws" means any law or regulation in any jurisdiction worldwide applicable to this Agreement and includes but it is not limited to the recycling or treatment of waste equipment including the laws implementing the WEEE Directive as defined hereinafter. "WEEE Directive" means the EU Directive on Waste Electrical Equipment and shall include any and all national laws and regulations, whether civil, criminal, administrative, in any jurisdiction giving effect to that meaning including, but limited to, statutes and subordinate legislation, ordinances permits, common law, local laws, judgments, and any notices, orders, directions, instructions or decisions of any competent authority. Harris may arrange for services, paid for by Customer, to recycle or dispose of Harris manufactured products in compliance with the Environmental Laws. Customer shall indemnify and hold Harris and each of its affiliates harmless against all expenses, costs, claims, liabilities or damage of any nature incurred by any of them relating to the collection, recycling, reuse and disposal of any Equipment or otherwise arising in connection with their respective obligations under the Environmental Laws, or by reason of any failure or alleged failure by Customer to comply with its obligations under the Environmental Laws. Customer shall provide Harris with such compliance plans or other documents and information that Harris may reasonably request to enable Harris and its affiliates to verify and prove to any enforcement agency the compliance by Customer and Harris of their respective obligations under this Section and the Environmental Laws. Harris may cancel any Order immediately upon notice to Customer if Harris determines that compliance with any applicable environmental law or regulation by Harris is not reasonably technologically or economically feasible, or would otherwise require Harris to change its manufacturing process.
- f. Equipment, Software and Services Sold to Lessors. If this transaction is (1) covered by a lease payment arrangement from a third party leasing company or (2) financed by a third party, and if payment to Harris is dependent on Customer's signing a release such that payment can be made by the lessor or finance company to Harris, then Customer agrees that the release for payment purposes will be executed at such time as 90% of the Equipment (by price) is shipped, the Equipment is substantially ready for on-air service or Customer puts the delivered Equipment into service, whichever is earliest.
- g. Default. If Customer defaults in any of Customer's obligations hereunder, including, but not limiting to failure to pay all sums when due, Customer will be liable for all costs to Harris resulting from Harris' attempt to enforce its rights hereunder, including, but not limited to collection agency fees, attorney fees, court costs, etc.
- h. Assignment. Customer shall not assign any of its rights under this Agreement, voluntarily or involuntarily, whether by merger, consolidation, dissolution, operation of law or any other manner. Any purported assignment of rights in violation of this Section is null and void.
- i. Enforceability. If any provision of this Agreement is held invalid, illegal or unenforceable, the validity, legality or enforceability of the remaining provisions will, to the extent of such invalidity, illegality, or unenforceability, be severed, but without in any way affecting the remainder of such provision or any other provision contained herein, all of which shall continue in full force and effect.
- j. No Waiver. Waiver or failure by Harris to enforce any of the terms or conditions hereunder or the delay in exercise of any of its remedies or any terms or condition herein, will not be a future waiver of any such right, or be a waiver of any other term, condition or remedy contained herein.
- k. Notices. All notices must be in writing and will be effective when received by (1) personal delivery, (2) registered, certified, or nationally recognized overnight mail, proof of receipt requested, and (3) facsimile, if confirmed within three (3) business days by one of the other methods herein, at the addresses or facsimile numbers indicated or to such other addresses or facsimile numbers as the parties may specify by giving notice pursuant hereto. A copy of all notices must be sent to Harris Corporation, 9800 S. Meridian Blvd., Suite 300, Englewood, CO 80112, USA, Attention: Contracts Department.
- l. Assumption of Risk. Each party hereto acknowledges (a) the risks of its undertakings hereunder, (b) the uncertainty of the benefits and obligations hereunder, and (c) its assumption of such risks and uncertainty. Each party has conducted its own due diligence and requested and reviewed any contracts, business plans, financial documents and other written material as in such party's opinion shall be the basis of that party's decision to enter into this Agreement.
- m. Publicity. Harris may, without the prior written consent of Customer, use in advertisements and/or any other media, any information relating to any Order or this Agreement. Customer reserves the right to review and approve the finished product, advertising copy or printed matter that may be used in such advertisements and/or other media.
- n. Reliance on Counsel and Other Advisors. Each party has consulted such legal, financial, technical or other experts it deems necessary or desirable before entering into this Agreement. Each party represents and warrants that it has read, knows, understands and agrees with the terms of this Agreement, and this Agreement shall not be construed against either party as the drafter.
- o. Compliance with Applicable Laws. Customer warrants that Customer shall comply with any and all applicable US federal and state laws, and shall operate in good faith to comply with other laws and regulations and industry best



Digital Television Transmitter System

practices, applicable to such party's performance hereunder, and shall promptly act to correct any noncompliance once identified.

p. Clauses Incorporated by Reference. The following Federal Acquisition Regulations/Defense Federal Acquisition Supplement ("FAR/DFARS") clauses are incorporated herein by reference, to the extent these clauses are applicable, with the same force and effect as if they are included in full text: 52.219-8 Utilization of Small Business Concerns, 52.222-26 Equal Opportunity, 52.222-35 Equal Opportunity for Special Disabled Veterans and Veterans of the Vietnam Era and other eligible Veterans, 52.222-36 Affirmative Action for Workers With Disabilities, 52.222-39 Notification of Employees Rights Concerning Payment of Union Dues or Fees, 52.247-64 Preference For Privately Owned U.S. Flag Commercial Vessels, 252.225-7014 Preference for Domestic Specialty Metals, Alternate I, 252.247-7023 Transportation of Supplies by Sea, and 252.247-7024 Notification of Transportation of Supplies by Sea.

q. Entire Agreement. This Agreement supersedes all previous proposals, negotiations, conversations, and understandings, whether oral or written, and constitutes the sole and entire agreement between the parties pertaining to the subject matter hereof. No modification or deletion of, or addition to these terms, will be binding unless made in writing and signed by duly authorized representatives of both parties.



State of West Virginia
 Department of Administration
 Purchasing Division
 2019 Washington Street East
 Post Office Box 50130
 Charleston, WV 25305-0130

Request for Quotation

RFQ NUMBER
EBA342

PAGE
1

ADDRESS CORRESPONDENCE TO ATTENTION OF:
SHELLY MURRAY
304-558-8801

PURCHASING

*709022530 01 513-459-3482
 HARRIS CORPORATION BROADCAST D
 5300 KINGS ISLAND DR # 101
 MASON OH 45040-2353

SHIP TO

EDUCATIONAL BROADCASTING
 AUTHORITY
 600 CAPITOL STREET
 CHARLESTON, WV
 25301-1223 304-558-3400

DATE PRINTED	TERMS OF SALE	SHIP VIA	F.O.B.	FREIGHT TERMS
04/05/2011				

BID OPENING DATE: **05/11/2011** BID OPENING TIME **01:30PM**

LINE	QUANTITY	UOP	CAT. NO.	ITEM NUMBER	UNIT PRICE	AMOUNT
0001	1	LS		840-65		
<p>THE WEST VIRGINIA PURCHASING DIVISION, FOR THE AGENCY, THE WEST VIRGINIA EDUCATIONAL BROADCASTING AUTHORITY, IS SOLICITING BIDS FOR ONE (1) 2 KW CHANNEL 29 DIGITAL TELEVISION TRANSMITTER SYSTEM PER THE ATTACHED SPECIFICATIONS.</p> <p>TECHNICAL QUESTIONS MUST BE SUBMITTED IN WRITING TO SHELLY MURRAY IN THE WEST VIRGINIA PURCHASING DIVISION VIA MAIL AT THE ADDRESS SHOWN AT THE TOP OF THIS RFQ, VIA FAX AT 304-558-4115, OR VIA E-MAIL AT SHELLY.L.MURRAY@WV.GOV. DEADLINE FOR ALL TECHNICAL QUESTIONS IS 04/25/2011 AT THE CLOSE OF BUSINESS. ALL TECHNICAL QUESTIONS RECEIVED, IF ANY, WILL BE ADDRESSED BY ADDENDUM AFTER THE DEADLINE.</p> <p>CANCELLATION: THE DIRECTOR OF PURCHASING RESERVES THE RIGHT TO CANCEL THIS CONTRACT IMMEDIATELY UPON WRITTEN NOTICE TO THE VENDOR IF THE COMMODITIES AND/OR SERVICES SUPPLIED ARE OF AN INFERIOR QUALITY OR DO NOT CONFORM WITH THE SPECIFICATIONS OF THE BID AND CONTRACT HEREIN.</p> <p>BANKRUPTCY: IN THE EVENT THE VENDOR/CONTRACTOR FILES FOR BANKRUPTCY PROTECTION, THIS CONTRACT IS AUTOMATICALLY NULL AND VOID, AND IS TERMINATED WITHOUT FURTHER ORDER.</p> <p style="text-align: center;">NOTICE</p>						

SEE REVERSE SIDE FOR TERMS AND CONDITIONS			
SIGNATURE <i>[Signature]</i>	TELEPHONE 513-459-3482	DATE 5/9/11	
TITLE Proposal Manager	FEIN 34-0276860	ADDRESS CHANGES TO BE NOTED ABOVE	

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'



State of West Virginia
 Department of Administration
 Purchasing Division
 2019 Washington Street East
 Post Office Box 50130
 Charleston, WV 25305-0130

Request for Quotation

RFQ NUMBER
EBA342

PAGE
2

ADDRESS CORRESPONDENCE TO ATTENTION OF:
SHELLY MURRAY
304-558-8801

VENDOR

*709022530 01 513-459-3482
HARRIS CORPORATION BROADCAST D
5300 KINGS ISLAND DR # 101

MASON OH 45040-2353

SHIP TO

EDUCATIONAL BROADCASTING
AUTHORITY
600 CAPITOL STREET

CHARLESTON, WV
25301-1223 304-558-3400

DATE PRINTED 04/05/2011	TERMS OF SALE	SHIP VIA	F.O.B.	FREIGHT TERMS
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BID OPENING DATE: **05/11/2011** BID OPENING TIME **01:30PM**

LINE	QUANTITY	UOP	CAT NO.	ITEM NUMBER	UNIT PRICE	AMOUNT
<p>A SIGNED BID MUST BE SUBMITTED TO:</p> <p>DEPARTMENT OF ADMINISTRATION PURCHASING DIVISION BUILDING 15 2019 WASHINGTON STREET, EAST CHARLESTON, WV 25305-0130</p> <p>THE BID SHOULD CONTAIN THIS INFORMATION ON THE FACE OF THE ENVELOPE OR THE BID MAY NOT BE CONSIDERED:</p> <p>SEALED BID</p> <p>BUYER: SHELLY MURRAY</p> <p>RFQ. NO.: EBA342</p> <p>BID OPENING DATE: 05/11/2011</p> <p>BID OPENING TIME: 1:30 PM</p> <p>PLEASE PROVIDE A FAX NUMBER IN CASE IT IS NECESSARY TO CONTACT YOU REGARDING YOUR BID:</p> <p style="text-align: center;">321-726-3237</p> <hr/> <p>CONTACT PERSON (PLEASE PRINT CLEARLY):</p> <p style="text-align: center;">Rich Lohmueller</p>						

SEE REVERSE SIDE FOR TERMS AND CONDITIONS

SIGNATURE <i>Rich Lohmueller</i>	TELEPHONE 513-459-3482	DATE 5/9/11
TITLE Proposal Manager	FEIN 34-0276860	ADDRESS CHANGES TO BE NOTED ABOVE

WHEN RESPONDING TO RFQ, INSERT NAME AND ADDRESS IN SPACE ABOVE LABELED 'VENDOR'

EBA342 – WV EBA Pricing Page

Digital Television Transmitter System. Shipping charges shall be included in product pricing.

ITEM NUMBER	QUANTITY	DESCRIPTION	UNIT PRICE	EXTENDED PRICE
1	1	Solid state transmitter	\$73,062.50	\$73,062.50
2	1	Mask Filter	\$7,378.82	\$7,378.82
3	1	Hardware necessary for connection between transmitter and mask filter.	\$1,461.18	\$1,461.18
4	1	Transmission line necessary for connection between transmitter and mask filter.	included in line item #3	
5	1	Couplers necessary for connection between transmitter and mask filter.	included in line item #3	
6	1	Adapters necessary for connection between transmitter and mask filter.	included in line item #3	
7	1	Receiver capable of decoding an off air 8VSB ATSC stream and rebranding the program PID tables	\$4,200.00	\$4,200.00
8	1	Power meter, Agilent E4416A or equal.	\$2,396.00	\$2,396.00
TOTAL				\$88,498.50
The following options WILL NOT be part of the winning bid decision making. These options MAY or MAY NOT be purchased individually.				
1	1	Dual redundant exciter system	\$17,000.00	\$17,000.00
2	1	Commissioning services for the transmitter	\$10,584.00	\$10,584.00
3	1	Installation of the transmitter	\$12,750.30	\$12,750.30
4	1	Spare RF PA module	\$1,759.50	\$1,759.50
5	1	220V single phase, split phase 225 amp surge suppressor. LEA Danasystem DS21-225A or equal.	\$2,975.00	\$2,975.00
TOTAL				\$45,068.80



Signature of Vendor Representative Submitting Bid

5/6/11

Date

STATE OF WEST VIRGINIA
Purchasing Division

PURCHASING AFFIDAVIT

West Virginia Code §5A-3-10a states: No contract or renewal of any contract may be awarded by the state or any of its political subdivisions to any vendor or prospective vendor when the vendor or prospective vendor or a related party to the vendor or prospective vendor is a debtor and the debt owed is an amount greater than one thousand dollars in the aggregate.

DEFINITIONS:

"Debt" means any assessment, premium, penalty, fine, tax or other amount of money owed to the state or any of its political subdivisions because of a judgment, fine, permit violation, license assessment, defaulted workers' compensation premium, penalty or other assessment presently delinquent or due and required to be paid to the state or any of its political subdivisions, including any interest or additional penalties accrued thereon.

"Debtor" means any individual, corporation, partnership, association, limited liability company or any other form or business association owing a debt to the state or any of its political subdivisions. "Political subdivision" means any county commission; municipality; county board of education; any instrumentality established by a county or municipality; any separate corporation or instrumentality established by one or more counties or municipalities, as permitted by law; or any public body charged by law with the performance of a government function or whose jurisdiction is coextensive with one or more counties or municipalities. "Related party" means a party, whether an individual, corporation, partnership, association, limited liability company or any other form or business association or other entity whatsoever, related to any vendor by blood, marriage, ownership or contract through which the party has a relationship of ownership or other interest with the vendor so that the party will actually or by effect receive or control a portion of the benefit, profit or other consideration from performance of a vendor contract with the party receiving an amount that meets or exceeds five percent of the total contract amount.

EXCEPTION: The prohibition of this section does not apply where a vendor has contested any tax administered pursuant to chapter eleven of this code, workers' compensation premium, permit fee or environmental fee or assessment and the matter has not become final or where the vendor has entered into a payment plan or agreement and the vendor is not in default of any of the provisions of such plan or agreement.

Under penalty of law for false swearing (*West Virginia Code §61-5-3*), it is hereby certified that the vendor affirms and acknowledges the information in this affidavit and is in compliance with the requirements as stated.

WITNESS THE FOLLOWING SIGNATURE

Vendor's Name: Harris Corporation, Broadcast Communications Division

Authorized Signature: *[Signature]* Date: 5/6/11

State of Ohio

County of Warren, to-wit:

Taken, subscribed, and sworn to before me this 6 day of May, 2011.

My Commission expires May 23, 2014.

AFFIX SEAL HERE

NOTARY PUBLIC *[Signature]*



SHARON S. CHAPMAN
Notary Public, State of Ohio
My Commission Expires
May 23, 2014
No. 2009-RE-257050



Compliance Statement

Description	Response	Clarification
<p>Request for Quotations EBA342 Digital Television Transmitter System The West Virginia Educational Broadcasting Authority (WVEBA) is conducting a request for quotations for one (1) 2 kW channel 29 digital television transmitter system. The West Virginia Educational Broadcasting Authority operates a statewide network of television transmitters. This project will add a digital translator to the WSWP site at Welch, WV. The power requirements for the site will be addressed in the specifications. The bid shall be awarded to a single vendor.</p>	Understood	
<p>1. Transmitter</p>		
<p>1.1. The transmitter manufacturer shall have a service department that is staffed 24 hours a day, 365 days a year.</p>	Comply	
<p>1.2. The transmitter manufacturer shall have been manufacturing broadcast digital television transmitters for the North American market for at least ten years.</p>	Comply	
<p>1.3. The vendor shall provide two sets of technical manuals. These manuals shall include installation instructions, operating instructions, tuning instructions, maintenance instructions, and troubleshooting procedures. The manuals shall also include parts list that includes the part number, circuit designator, description, and generic number whenever possible. The manuals shall include wiring diagrams with wire numbers and circuit schematics with component designators and values.</p>	Comply	
<p>1.4. The transmitter shall be capable of providing adequate power to meet the licensed authorization.</p>	Comply	
<p>1.5. Transmitter shall be FCC approved for the service and power levels anticipated, the ATSC 8-VSB digital television signal produced shall be high quality and comply with all applicable FCC regulations and EIA standards.</p>	Comply	
<p>1.6. All components shall have adequate capacity to allow transmitter to operate at its maximum rated power level for 24 hours a day, 365 days a year.</p>	Comply	
<p>1.6.1. Maximum power shall not be less than 2.0kW measured at the output of the mask filter</p>	Comply	
<p>1.7. Vendor shall provide a mask filter meeting FCC requirement for "Stringent Mask" and all</p>	Comply	

Description	Response	Clarification
interconnecting hardware.		
1.8. Vendor shall provide all hardware, transmission line, couplers, adapters necessary for connection between the transmitter and the supplied mask filter.	Comply	
1.9. Mask filter shall output to a 1 5/8" EIA connector	Comply	
1.10. Transmitter shall be solid state with field replaceable RF modules.	Comply	
1.10.1. Solid state RF modules shall be front access, plug-in units capable of being removed or installed during the normal on-air operation of the transmitter. It shall not be necessary to reduce RF drive, remove cabinet power, or make any adjustments when replacing modules.	Comply	
1.10.2. No soldering shall be required to change RF modules	Comply	
1.10.3. In the event of a RF or device failure the PA module will continue to operate at reduced power	Comply	
1.10.4. All PA modules shall be completely identical and interchangeable with no degradation in performance.	Comply	
1.10.5. RF modules shall be field replaceable by one person	Comply	
1.11. Transmitter shall be air cooled. Liquid cooled designs will not be considered.	Comply	



Description	Response	Clarification
1.12. Transmitter shall have the ability to exhaust air used for cooling the transmitter outdoors. Air intake shall be from indoor air	Comply with clarification	Standard transmitter configuration is with a perforated rear door. With an optional solid door, the exhaust air can be routed to a customer supplied exhaust duct.
1.13. The transmitter shall be of a very compact design and comprise 19" rack mount assemblies.	Comply	
1.14. The transmitter shall include any enclosures needed to house the individual sub-assemblies.	Comply	
1.15. Transmitter shall have protection against excessive VSWR, RF input overdrive, over-temperature, over or under voltage, and over current conditions.	Comply	
1.16. Transmitter shall have metering of: voltage, current, RF power (forward and reverse), cooling fault, PA fault, exciter fault, and power supply fault available for display on the front panel	Comply	
1.16.1 . These parameters shall be available for remote telemetry.	Comply	
1.17. Transmitter shall have remote control capability	Comply	
1.18. Transmitter shall be FCC approved for the service and power levels anticipated	Comply	
1.19. Transmitter shall be configured to operate on single phase 220V AC	Comply	Single phase 220V
1.20. Upon loss of power the transmitter shall restart in it's last powered state when power is returned	Comply	
1.21 . Exciters shall provide pre-correction and equalization	Comply	
1.21 .1. Equalization shall be adaptive.	Comply	
1.21.2. Fully automatic correction of both linear and non-linear distortions shall be performed in a seamless and continuous manner.	Comply	
1.22. If an external power amplifier is used to attain the required power level, sensing shall be provided to allow adaptive equalization of the entire transmitter system	Comply	
1.23. The exciter shall include an internal UPS or battery back-up system capable of maintaining frequency lock on the master oscillator and synthesizer to allow fast recovery after a power failure of up to 2 hours.	Comply with clarification	Up to 45 minutes

Description	Response	Clarification
1.24. The exciter shall accept a SMPTE-31 0 digital stream	Comply	
1.25. A receiver capable of decoding an off air 8VSB ATSC stream and rebranding the program PID tables shall be provided .	Comply	Harris is offering the KTech channel converter model FRQ-200.
1.26. Receiver shall accept an ASI input in addition to the 8VSB signal.	Comply	
1.26.1. Inputs shall be selectable	Comply	
1.27. The receiver shall output to a SMPTE-310 stream	Comply	
1.28. Vendor shall provide a power meter	Comply	
1.28.1. Frequency range 9 kHz to 110 GHz	Comply with Clarification	Power Range is 40 MHz – 4.0 GHz
1.28.2. Power range -70 to +44 dBm sensor dependant	Comply with Clarification	Power Range is -20 to +10 dBm
1.28.3. If a power sensor is required vendor shall provide a sensor rated for the transmitter frequency and power levels anticipated at the sample port	Comply	
1.28.4. A power sensor cable, if needed shall be provided	Comply	
1.28.5. Meter input shall be a N type female connector, 50 ohms	Comply	
1.28.6. Agilent E4416A or equal	Comply	BIRD 5000-XT with 5011 power sensor and hard case
2. Site requirements 2.1. Welch, West Virginia 2.1.1 . Transmitter shall operate on channel 29 2.1.2. Transmitter Power Output (TPO) required shall be 1706 watts average power. 2.1.3. TPO shall be measured at the output of the mask filter.	Comply	



Description	Response	Clarification
<p>3. Future Upgrades 3.1. Vendor shall have demonstrated upgrade capabilities of hardware and software not limited to the following: 3.1.1. Hardware upgrade would primarily consist of additional modules to increase power output 3.1.2. Software upgrades relating to the advances in processing and adaptive correction and equalization</p>	Comply	Currently the maximum size air cooled transmitter is 2KW after filter.
<p>4. Optional Equipment 4.1. The following options will not be part of the winning bid decision making. The options may or may not be purchased .</p>	Comply	
<p>4.1.1. Vendor is requested to include an option for dual redundant exciters.</p>	Comply	
<p>4.1.1.1. The optional redundant exciter system shall be able to detect a fault in the primary exciter and switch to the redundant exciter if a fault is detected automatically</p>	Comply	
<p>4.1.2. Vendor is requested to provide an option for commissioning services for the transmitter.</p>	Comply	
<p>4.1 .3. Vendor is requested to provide optional pricing for installation of the transmitter.</p>	Comply	
<p>4.1.3.1 Items to be installed in and or to vendor supplied cabinet: Power Supplies RF modules Exciter connections connect RF amplifiers to RF combiner and duplexing system.</p>	Comply	Included in the optional installation price.
<p>• 4.1.4. Vendor is requested to provide optional pricing for a spare RF PA module for the transmitter.</p>	Comply	
<p>• 4.1.5. Vendor is requested to provide optional pricing for a 120/240V single phase, split phase 225 amp surge suppressor</p> <p>4.1.5.1. Nominal operating voltage: 120 to 480 VAC</p> <p>4.1.5.2. Surge capacity per phase: Minimum of 200 kA</p> <p>4.1.5.3. Surge capacity per mode: Minimum of 100 kA</p> <p>4.1.5.4. Connection: Series</p> <p>4.1.5.5. Response time: <1 ns</p>	Comply	



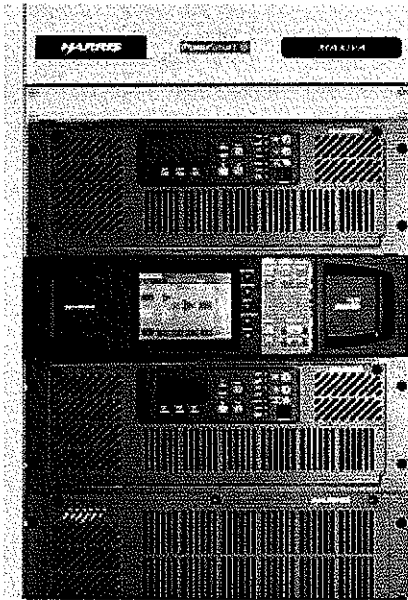
Description	Response	Clarification
4.1.5.6. LEA Danasystem DS21 -225A or equal		
5. Shipping and delivery 5.1. Vendor shall provide shipping 5.2. Shipping charges shall be included in the equipment price 5.3. Delivery shall be FOB Destination 5.4. The receiving facility shall be WSWP studios: WV Educational Broadcasting Authority 124 Industrial Park Road Beaver, WV 25801 Attn: Jeremy Scott 304-254-7840 5.5. Shipper shall provide 24 hours notice to arrange off-loading 5.6. Shipper shall provide off-loading equipment and be responsible for off-loading transmitter and associated hardware.	Comply	
6. Warranty 6.1. All products shall be warranted for a period of one year. 6.2. Bidders shall state their warranty policy.	Comply	
7. Support 7.1. Vendor shall provide toll-free phone support for all items for a minimum of five years	Comply	

Maxiva™ UAX

PowerSmart®

Air-Cooled UHF Multimedia TV Transmitter

TV TRANSMISSION AND DEMODULATION // MAXIVA™ UAX



The Maxiva™ UAX air-cooled UHF solid-state transmitter incorporates Harris® PowerSmart™ technology and the Maxiva UAX multimedia exciter to provide today's broadcaster unmatched performance, reliability and quality. Designed with future broadcasting needs in mind, the Maxiva UAX transmitter is a single-transmitter platform capable of DVB-T/H, DVB-T2, ATSC, ATSC MH, FLO, ISDB-Tb, CCMB, CTTB or other digital standards.

For power requirements up to 2 kW COFDM and 3 kW analog, Maxiva UAX transmitter was developed to leverage complementary technologies from several Harris products: the Apex™ multimedia exciter, the compact and reliable ZX® FM and DMB 670 VHF transmission solutions, and the Harris PowerSmart design initiative for RF amplification. This powerful blend provides best-in class performance with respect to transmitter size and functionality.

Harris PowerSmart Technology Inside

Featuring Harris PowerSmart technology in its transmitter architecture, the Maxiva UAX line offers superior power and efficiency. New 50-volt LDMOS device technology delivers a dramatic increase in power density, lower operating costs and reduced cost of ownership over the life of the transmitter.

FEATURES

- PowerSmart technology, for best-in-class power efficiency and lowest operating costs
- Rugged, reliable design and construction
- Digital and analog power levels up to 2 kW and 3 kW, respectively
- Maxiva UAX Exciter, allowing easy migration from analog to digital or between different standards
- All-digital linear and non-linear pre-correction; optional Real-Time Adaptive Correction (RTAC™)
- Fully broadband PA modules — 470 to 862 MHz
- 1:1 PA module to power supply redundancy
- Hot-pluggable air-cooled linear RF amplifier modules
- Automatic restart after AC mains interruption; returns to previous operational mode
- Modular central control system for straightforward monitoring and in-depth diagnostics
- Harris eCDI® Web-enabled remote GUI interface

PRODUCT DETAILS

Maxiva UAX exciter

Utilizing the same electronics as the Harris Apex M2X multimedia exciter, the Maxiva UAX exciter takes digital and mobile TV to the next level. Harris digital exciters have logged more hours in "real-time" broadcast than all others combined. The Maxiva UAX exciter provides a flawless signal with complete technical and regulatory compliance for tube and solid-state digital transmitters. The Maxiva UAX exciter supports a wide range of global digital standards including ATSC, ATSC mobile, DVB-T/H, ISDB-TB, FLO, CTTB, CMMB and a range of analog TV standards, including NTSC and PAL.

The Maxiva UAX exciter supports a range of analog, digital and mobile standards and allows for a smooth conversion from analog to digital transmission. This flexibility, coupled with the optional RTAC correction, provides superior performance.

Compact Footprint

Suited for crowded, shared transmitter sites, the Maxiva UAX transmitter reduces facility space requirements and simplifies installation.

Powerful, Straightforward Monitoring and Control

The main system control is located in the low-power unit and communicates with each amplifier bay that has independent protection and control capabilities. Each PA module has dedicated control and monitoring to support on/off functionality and alarms for reflected power, temperature and current overloads.

For maximum reliability, the optional transmitter control system (available for 1 kW and 2 kW models only) includes two parallel levels of operational support: a basic mode and an enhanced mode. The basic mode provides minimal control of the transmitter platform using a small number of parallel signals, simple interface controls and front-panel indicators. This can be used during maintenance or as a backup to the main enhanced controller. The enhanced mode provides a front-panel, color touch-screen display, SNMP communications support and IP connectivity via the built-in eCDI Web GUI interface. Ideal for network operations, the control system can be accessed from anywhere in the world via TCP/IP over a telecom or network connection.

Improved Up Time and Reduced Service Costs

Redundant power amplifier (PA) and universal power supply (PS) modules make on-air servicing a breeze, and eliminate costly interruptions. Lightweight pallets and modules facilitate overnight/ same-day shipping for simple, cost-effective spares holding. The Maxiva UAX transmitter also supports replacement of pre-tuned amplifier pallets in the field, eliminating the need for complex tuning after FET replacement.

SPECIFICATIONS

General

Frequency Range	470 to 862 MHz
Channel Bandwidth	6, 7 or 8 MHz
RF Load Impedance	50 ohms, 1.1:1 VSWR over any single TV channel
RF Output Connector	Type-N female, Type-N, 7-16 DIN and 1-5/8 in. EIA (dependent upon power level)

AC Mains

AC Mains Requirement	Up to 750 W: 90 to 264 V AC, 47 to 63 Hz, dual IEC C20 inlets; 500 to 3000 W: 200 to 264 V AC 47 to 63 Hz, triple IEC C20 inlets for each 1500/3000 W chassis; configurable on-site for single or three-phase connection: 200 to 264 V AC single phase, 200 to 264 V AC delta, 200 to 264 V AC wye, or 350 to 450 V AC wye; optional in-rack AC distribution chassis provides individual circuit breaker protection for each AC input.
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Power Factor >0.90

Environmental

Altitude	Up to 13,123 ft (4,000 m) elevation above mean sea level
----------	--

HARRIS

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Maxiva™ UAX

Air-Cooled UHF Multimedia TV Transmitter

TV TRANSMISSION AND DEMODULATION // MAXIVA™ UAX

Ambient Temperature Range	32° to 113° F (0° to 45° C) at sea level (upper limit derated 35.6° F (2° C) per 984 ft (300 m) elevation AMSL)
Humidity	95%, non-condensing
Cooling Method	Air input with built-in filter at front; air exhaust with built-in DC fans at rear; ducted air exhaust and/or input available as option

ANALOG

Analog Television Systems	CCIR G, I, K, K1, M, N
Color Systems	PAL, NTSC, SECAM
Sound Systems	Monaural, BTSC, IRT, NICAM G
Power Output	(Vision peak of sync) 15 W to 3 kW available

Analog Video Performance:

Video Input	Two inputs 75 ohms, 0.7 to 1.4 V, 75 ohm, 34 dB return loss
Regulation of Output Power ¹	±3%
Variation of Output Power ²	±2%
Vision Sideband Response ³	PAL system G shown (other systems available)
-1.25 MHz and below	-20 dB or less
-4.43 MHz	-30 dB or less
-0.75 MHz to -1.25 MHz	+0.5 dB or less
-0.5 to +4.5 MHz	+0.5 to -0.5 dB
+5.0 MHz	+0.5 to -2.5 dB
+5.75 MHz and above	-35 dB or less
Frequency Stability ⁴	±150 Hz/month
Differential Gain ⁵	3%
Differential Phase ⁵	3°
Low Frequency Linearity ⁶	10%
Incidental Carrier Phase Modulation ⁵	±2°
Signal to Noise Ratio	>60 dB (weighted)
K Factor	2% or less with 2T sin2 pulse
20T Equivalent Gain & Delay	3% total baseline distortion
Spurious & Harmonic Radiation	-60 dB or better
In-Channel Intermodulation Distortion	-60 dB or better

Analog Sound Performance:

Frequency Stability	±150 Hz/Month
Modulation Capability	±120 kHz peak deviation
Monaural Input	Adjustable 0 to +12 dBm, 600 ohms, balanced, >30 dB return loss
Pre-Emphasis	Selectable 75 µs or 50 µs
Frequency Response	±0.5 dB, 40 Hz to 15 kHz
Harmonic Distortion	0.5%, 30 Hz to 15 kHz
FM Noise	60 dB r.m.s. with de-emphasis
AM Noise	50 dB r.m.s. from 30 Hz to 15 kHz
Synchronous AM Noise	40 dB r.m.s. at 400 Hz with ±25 kHz deviation
IRT Sound	Available on request
NICAM Sound	Available on request

DVB-T Specifications

Power Output (Average)	10 W to 2 kW available; measured at output of optional mask filter
Systems	DVB-T, standard ETS 300744, ISDB-TB – Brazil standard

ASI Inputs	4 type BNC female; 75 ohms acc. to EN 50083-9 (2 main/2 hierarchical)
Output Power Reduction	0 dB to -6 dB
Crest Factor	Max. 13 dB
Shoulder Level	<-37 dB (before mask filter)
END	≤0.7 dB
MER	>34 dB
Harmonics (before filter)	<-40 dB
Central Carrier Suppression	>75 dB
Frequency Stability (without external reference)	±150 Hz/month
Frequency Offsets	2 MHz resolution

ATSC Specifications

Power Output (Average)	10 W to 2 kW available; measured at output of optional mask filter
System	ATSC A-53, 8-VSB DTV standard
Data Input	Data 19.39 Mb/s
	Impedance 75 ohms, unbalanced
	Standard SMPTE 310M
	Connector 2 BNC female, isolated
External Precise Frequency Input	Frequency 10 MHz, sinusoidal
	Impedance 50 ohms, unbalanced
	Level 0 to +10 dBm
	Connector BNC 50 ohms, female
Signal to Noise (EVM)	27 dB or better (4% or less)
Phase Noise	<104 dBc/Hz @ 20 kHz offset (ATSC A/64)
Pilot Frequency Stability	Less than ±150 Hz/month
	Less than ±3 Hz with internal or external PFC
Harmonic Radiation and Spurious	Meets mask requirements specified in FCC 5th and 6th report and order
Sideband Performance	Compliant with FCC radiation mask, when measured at the output of Harris-supplied output filter

Remote Control

Parallel REMOTE	DB-37, female
Relay Contacts	25 mA @ 24 V DC
Digital Inputs (TTL level)	Pulse duration ≥100 ms or permanent signal
Ethernet/SNMP (optional)	RJ-45, twisted pair

Compliance

- RoHS 2002/95/EC
- R&TTE 1999/5/EC
- Safety: EN 60215
- EMC: EN 301-489-1
- FCC Part 73

¹ Variation of peak output power with a change in average picture level from black to white (0% to 100%).

² Peak-to-peak variation of peak sync voltage during one field using field test signal per EIA-508.

³ Response specified for transmitter operating into a resistive load of 1.05:1 VSWR.

⁴ After initial aging of 60 days.

⁵ Measured using 20% peak-to-peak amplitude swept video modulation with pedestal set at 10%, 50% and 90% APL. All percentages relative to a blanking to white transition.

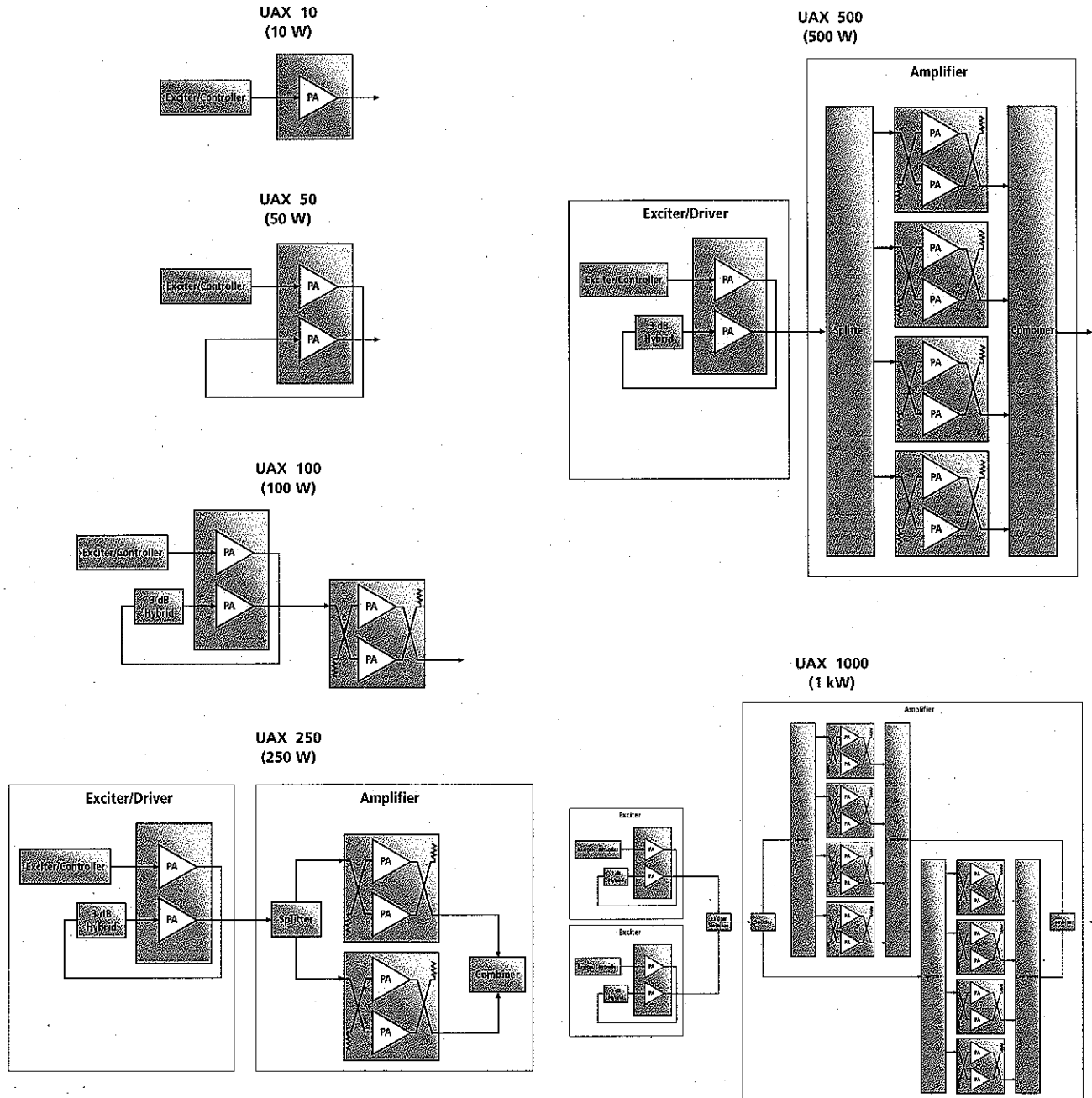
⁶ Measured using a 5-step staircase signal. Test signal #3, CCIR REC. #421-3 Derate maximum temperature by 35.6° F (2° C) per 1000 ft (305 m) above mean sea level.

Maxiva™ UAX

Air-Cooled UHF Multimedia TV Transmitter

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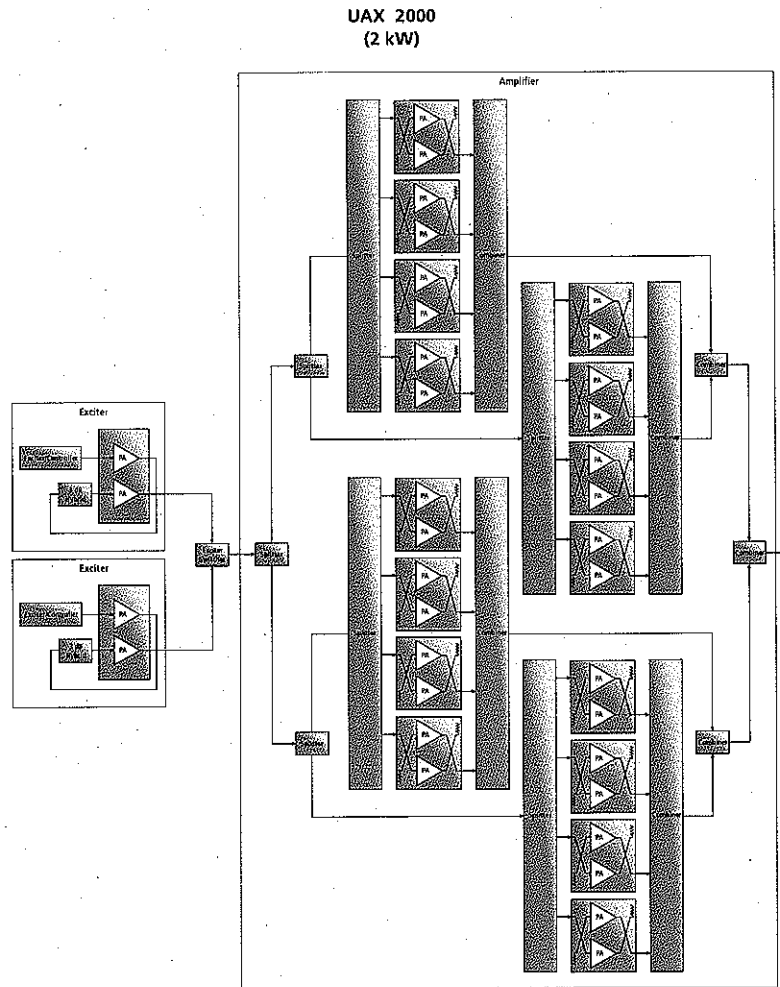
IMAGES/DIAGRAMS
Maxiva UAX Configurations



Maxiva™ UAX

Air-Cooled UHF Multimedia TV Transmitter

TV TRANSMISSION AND DEMODULATION // MAXIVA™ UAX



	Power after filter-Watts	Output Connector	Total Rack Space (*with dual exciters)
Maxiva UAX-10	10	"N" female	4RU
Maxiva UAX-50	50	"N" female	4RU
Maxiva UAX-100	100	"N" female	4RU
Maxiva UAX-250	250	"N" female	9RU
Maxiva UAX-500	500	"N" female	9RU
Maxiva UAX-1000	1,000	DIN 7-16	14RU/*21RU
Maxiva UAX-2000	2,000	1-5/8 in. EIA	24RU/*31RU

Hand-Held Digital Power Meter

Bird® Model 5000-XT

The hand-held digital power meter has been completely redesigned with the new Bird® 5000-XT. Ideally suited for field techs and engineers who need to make power measurements anywhere they go, the 5000-XT's new user interface has an intuitive, menu-driven design, making it the easiest to use on the market. It's operable even with one hand and compatible with all our field and legacy sensors.

PROBLEMS

Poor lighting or bright light

Lack of access to AC

Physically demanding environments

Varying field tech skill levels

Need for power measurement comparison

SOLUTIONS

Indoor/outdoor viewable monochrome VGA display with backlight

Up to 60 hours of continuous use battery life

Single key allows one-hand toggling through operations

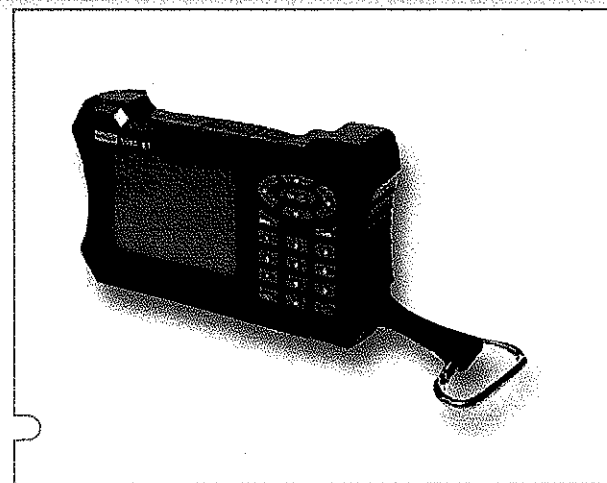
Locking mechanism prevents unintentional sensor disconnects

Compliant with MIL spec drop test

Lightweight at 1.4 lbs.

Automatically detects sensor and displays appropriate power measurement screen

Data logging capability with 1 GB of memory, storing and transfer of up to 7 days of data



APPLICATIONS

Signals measured: WiMAX, (IEEE 802.16), GSM/EDGE, W-CDMA, LTE, WiFi (802.11), HSPA/HSDPA, TD-SCDMA, TETRA, P25, Zigbee (IEEE 802.15), Bluetooth, RFID, DVB, DMB and MediaFlo

Measurements performed: VSWR, peak power, true average power, crest factor, CCDF and burst power

Sensors supported: 11

Display languages: English, Spanish, or Mandarin Chinese

Hand-Held Digital Power Monitor

Bird® Model 5000-XT

SPECIFICATIONS

Display	Indoor/Outdoor Viewable Monochrome VGA Display with Backlight
Functions (Sensor Limited)	VSWR Peak Power True Average Power Crest Factor CCDF Burst Power Data Logging
Sensor Detection	Automatic
Battery	Rechargeable, Field Replaceable, Lithium Ion Batteries
AC Adapter/Charger	115/230 VAC, 50/60 Hz
Battery Life	20 Hours Continuous Usage with WPS Series Sensors 60 Hours Continuous Usage with All Other Sensors
Calibration Interval	No calibration required
Languages	English, Mandarin, Spanish
Dimensions	6.6"x4.0"x1.95" (168 mm x 102 mm x 50 mm)
Interface	Sensor DB9 USB 2.0 SeaLatch Type A PC USB 2.0 SeaLatch Type B
Weight with battery	1.4 lbs
Operating Temp.	0 to +50 °C
Storage Temp.	-20 to +50 °C
Drop Tested	EN 61010-1, MIL-STD-810F, MIL-PRF-28800F, Class 2
International Certs.	CE, RoHS

ACCESSORIES

5A5001-1	Battery, Installed
5A5002-1	Power Supply, Includes Brick, cord, 3 Intl Adaptors
5A2238-4	Cigarette adaptor
5A2653-10L2	USB SeaLatch Cable, 10'
5A2264-09-MF-10	DB9 Cable, 10'
920-5000-XT	Operations Manual, Multilanguage
5A5000-1	Soft Case
5A5000-2	Lanyard
5A5000-3	Carabiner

COMPATIBLE SENSORS

5010	Direction Power Sensor, Legacy
5010B	Direction Power Sensor, DB9
5011	Terminating Power Sensor, 4 GHz, DB9
5011-EF	Terminating Power Sensor, 12 GHz, DB9
5012	Wideband Power Sensor, Legacy
5012A	Wideband Power Sensor
5014	Direction Power Sensor, USB
5015	Terminating Power Sensor, 4GHz, USB
5015-EF	Terminating Power Sensor, 12GHz, USB
5016	Wideband Power Sensor, Low Power Version
5017	Wideband Power Sensor, Low Frequency Version



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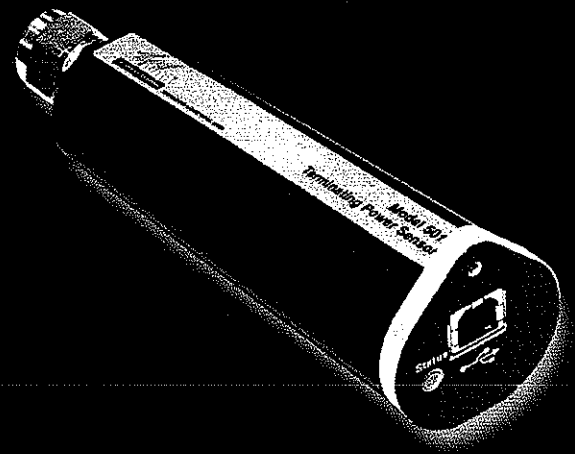
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Bird[®] Terminating Power Sensor

5011, 5011-FF, 5015, 5015-FF

The Bird Terminating Power Sensor (TPS) is the easiest to use and most cost competitive terminating sensor on the market. This one port measurement device will provide True Average Power for forward power or reflected power if attached to a directional coupler or total power in the line if connected to a non-directional coupler. The TPS is a true plug and play solution with no front panel calibration required at any time.

The TPS is truly the most economical terminating sensor, half the price of our leading competitors. Quite a value considering the TPS is a highly accurate (5%) device with calibration traceable to the National Institute of Standards and Technology (NIST). Now available in a USB compatible version.



PROBLEMS

Tight budgets

Varying field tech skill levels

Need greater confidence in measurement

SOLUTIONS

- USB connectivity, no meter required
- Complimentary Virtual Power Meter (VPM2) software
- Sensor plugs and plays with 5000-XT meter.
- No field calibration required
- NIST traceable calibration

APPLICATIONS

WPS measures: Analog Cellular, Digital Cellular, 3G, 4G, Tetra, APCO/P25, Trunking, CDMA, TDMA, WCDMA, GSM, Transportation, Tactical Military, Radar, Avionics, Marine, LMR, Analog Broadcast, Digital Broadcast, GSM, GPRS, EDGE, UMTS, HSDPA, Bluetooth, Fire, GPS, NPSPAC, Paging, Project 25, Public Safety, Telematics, Utilities, WIMAX and WLAN.

Measurements performed: True average power.

Bird® Terminating Power Sensor

5011, 5011-EF, 5015, 5015-EF



TPS SPECIFICATIONS

Frequency Range	5011	40 MHz - 4.0 GHz
	5011-EF	40 MHz - 12 GHz
	5015	40 MHz - 4.0 GHz
	5015-EF	40 MHz - 12 GHz
Power Range		-20.000 to +10.000 dBm (10.0010 µW to 10.000 mW)
Impedance		50 Ohms
Peak/Average Ratio		12 dB max.
Accuracy		± 5% of Reading. When operating below 100 MHz and above 40 °C, add 1 %
Insertion VSWR	5011	Typical 1.03 (36.6 dB return loss); maximum 1.20 (20.8 dB return loss)
	5011-EF	Typical 1.05 (32.3 dB return loss); maximum 1.25 (19.1 dB return loss)
	5015	Typical 1.03 (36.6 dB return loss); maximum 1.20 (20.8 dB return loss)
	5015-EF	Typical 1.05 (32.3 dB return loss); maximum 1.25 (19.1 dB return loss)
Warm Up Time		5 Minutes
Connector(s)		Precision N Male
Power Supply		From host instrument via cable connection
Interface(s)	5011	DB9 (Proprietary Configuration)
	5011-EF	DB9 (Proprietary Configuration)
	5015	USB 1.1 Type B
	5015-EF	USB 1.1 Type B
Weight		.75 lb. maximum
Size [inches (mm)]		6" (152 mm) long (including connector); 1.5" (38 mm) diameter
Altitude		15,000 ft. (4570 m) operating
Humidity, Max.		95% maximum (non-condensing)
Safety		Complies with Directive 2006/95/EC for Low Voltage, per EN 61010-1:2001 Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory use.
EMC		Complies with Directive 2004/108/EC Relating to Electromagnetic Compatibility, per EN 61326-1:2006 Electrical Equipment for Measurement, control, and Laboratory use.
Operating Temps [°C(°F)]		-10 to 50 (14 to 122)
Storage Temps [°C(°F)]		-40° to +80°C (-40° to +176°F)
Mechanical Shock & Vibration		MIL-PRF-28800F class 3

ACCESSORIES

8353A040-50	40 dB Attenuator, 50 W, 4 GHz
8353A030-10	30 dB Attenuator, 10 W, 4 GHz
8353A040-50-18	40 dB Attenuator, 50 W, 18 GHz
8353A030-10-18	30 dB Attenuator, 10 W, 18 GHz
4240-500-1	Adapter, N (F) to N (F)
4240-500-3	Adapter, right angle, N (F) to N (M)
4240-500-4	Adapter, N (F) to SMA (F)
4240-500-5	Adapter, N (F) to SMA (M)
PA-FNME	Adapter, N (F) to 7/16 DIN (M)
PA-FNFE	Adapter, N (F) to 7/16 DIN (F)
TC-MNFN-1.5-G	Test cable, 1.5 m., N (M)/N (F) conn.
TC-MNFN-1.5	Test cable, armored, PS, 1.5 m., N (F) to N (M)
TC-MNFN-3.0	Test cable, armored, PS, 3.0 m., N (F) to N (M)
5011A035-1	DC Block, N (F) to N (M)
5A2653-10L2	USB Locking Cable, 10'
5A2653-6L	USB Locking Cable, 6'
5A2653-10	USB Cable, 10'
5A2264-09-MF-10	DB9 Cable, 10'

COMPATIBLE DEVICES

5011, 5011-EF	5000-EX 5000-XT SA-1700 EXP SA-2500 EX SA-6000 EX SH-36S SH-361S SH-362 SH-362S
5015, 5015-EF	5000-XT VPM2



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Application Note

8-VSB to DVB-ASI / SMPTE-310M Converter

Model Number: VSB-FRQ-200



Introduction

This application note describes the VSB-FRQ-200 and its applications.

Product Description

The VSB-FRQ-200 is an 8-VSB Receiver that demodulates an 8-VSB terrestrial signal, QAM CATV signals (CH 1-125), updates the PSIP VCT, and generates DVB-ASI and SMPTE-310M output signals simultaneously. This unit can also be used for DVB-ASI to SMPTE-310M, SMPTE-310M to DVB-ASI.

The main features of the VSB-FRQ-200 are:

- Demodulates 8-VSB/QAM RF signals to ASI and SMPTE-310M
- 8-VSB/QAM RF Input
- DVB-ASI and SMPTE-310M Inputs & Outputs
- IF Output Test point
- **PSIP VCT User Modification**
 - Major Channel #
 - Minor Channel #
 - Station ID
 - Transport Stream ID
 - Channel Transport Stream ID
- Stores TX VCT User Modified Parameters
- **Performs PCR Correction and Null Packet Insertion/Deletion with fixed output rate at 19.392 Mbps**
- **Bypass mode to skip PCR Correction and Null Packet Insertion**
- Loss of Transport Stream Alarm
- RS232, Web-based Ethernet and Front Panel Control
- 1U Rack Mountable

Functional Block Diagram

The signal flow through the VSB-FRQ-200 is shown below in Figure 1.

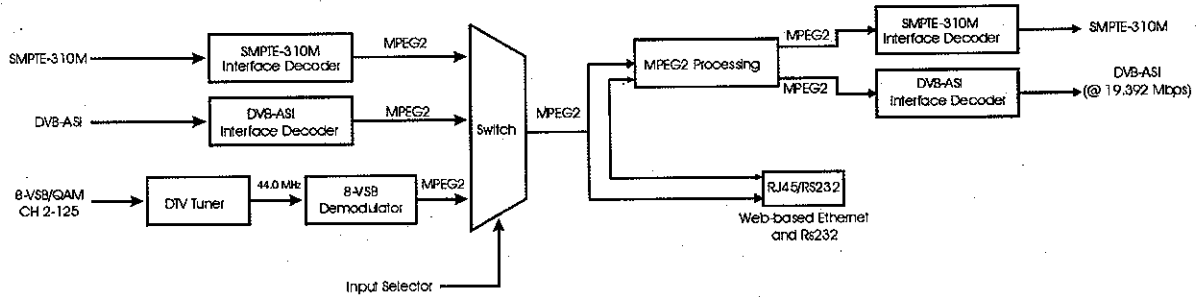


Figure 1: Functional Block Diagram of the VSB-FRQ-200

DTV Tuner

The DTV Tuner accepts an 8-VSB RF signal and down converts it to a 44.0 MHz IF signal. The DTV Tuner accepts 8-VSB RF signal inputs for VHF/UHF channels #2-69.

8-VSB Demodulator

The 8-VSB Demodulator demodulates the 44.0 MHz IF signal into an MPEG2 baseband signal. It's equalizer and Reed Solomon decoding techniques, help correct channel multipath errors. It also performs digital matched filtering to optimize performance over noise.

Interface Decoders

DVB-ASI or SMPTE-310M transport streams can be fed into the VSB-FRQ-200. These signals feed into interface decoders that output MPEG2 Transport Streams. Note: The VSB-FRQ-200 can accept any DVB-ASI signal that has a rate less than or equal to:

- 45 Mbps If SMPTE-310M and DVB-ASI outputs are desired, the DVB-ASI Input should not exceed 45 Mbps.

Switch and Input Selector

All three MPEG2 Streams that are present are fed into the switch. The Input Selector chooses the MPEG2 stream that will be present at the output. The input selector is controlled using the Front Panel User Interface, the web-based Ethernet or via RS232.

Baseband Processing

The baseband processing includes the Null Packet Insertion or Removal, PCR Correction and PSIP Modification. The first step in the process is Null Packet Insertion or Removal. Note: Baseband Processing only occurs for DVB-ASI Inputs less than or equal to 45 Mbps. If SMPTE-310M and DVB-ASI outputs are desired, the DVB-ASI Input should not exceed 45 Mbps.

The Null Packet Insertion/Removal does the following:



Figure 2: Null Packet Insertion/Removal

When the MPEG2 Transport Stream is greater than 19.292 Mbps, the null packets in the stream are removed before entering the FIFO. When the MPEG2 Transport Stream output of the FIFO is less than 19.392 Mbps, null packets are inserted into the MPEG2 Transport Stream to bring the rate back up to 19.392 Mbps.

The second step is PCR Correction. The Program Clock Reference (PCR), embedded within the transport stream, is used to synchronize a receiver's clock with an encoder's clock. The original PCR values that were stamped into the stream by the original encoder will not be the correct PCR values for the receiver after null packets are inserted into or deleted from the stream. Therefore the PCR values need to be re-stamped so that the receiver will have the correct PCR values, thus avoiding PCR clock jitter at the receiver end.

The final step is the PSIP modification where the VCT's STID, Major & Minor Channel Numbers are modified within the stream.

Interface Encoders

The Interface Encoders transform the 19.392 Mbps MPEG2 signal into the DVB-ASI or SMPTE-310M I/O Interface Standards. The SMPTE-310M signal at 19.392Mbps is available at the SMPTE Output. The DVB-ASI at a fixed rate of 19.392Mbps is available at the two ASI Outputs and at the ASI Testpoint on the front panel.

Applications

Application #1: Cable Television Service Providers

One application of the VSB-FRQ-200 is at the head end of a digital CATV Service Provider where it may be desired to receive a local 8-VSB DTV broadcast. The VSB-FRQ-200 demodulates the 8-VSB signals to baseband where the PSIP VCT can be updated if so desired. The DVB-ASI output of the unit can then be connected to a multiplexer or a QAM Modulator and the DTV signal can be delivered to the consumer's digital set top box.

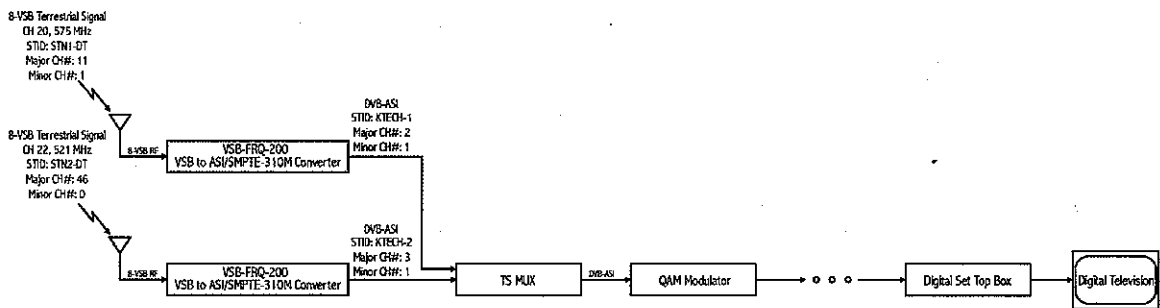


Figure 1: Application of the VSB-FRQ-200 for a Cable Service Provider

Application #2: Public Broadcasting Stations

The VSB-FRQ-200 is also well suited for Public Broadcasting Station use since the satellite feed at a local station is usually available in DVB-ASI format. In this application the VSB-FRQ-200 acts as a DVB-ASI to SMPTE-310M converter. The satellite feed signal is connected to the VSB-FRQ-200's DVB-ASI input and the Major Channel Number, the Minor Channel Number, and the Station ID are changed. The signal from the SMPTE-310M output can then be sent to a DTV exciter for broadcast transmission. The signal now contains properly updated PSIP information to be used in a local broadcast.

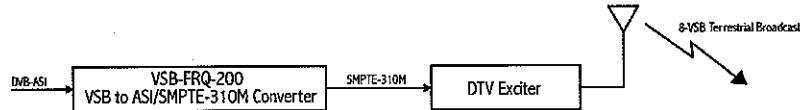


Figure 2: Application of the VSB-FRQ-200 for a Public Broadcasting Station

Application #3: ASI STL transport to Transmitter site (SMPTE-310M)

Another Application of the VSB-FRQ-200 is to use it to apply PCR to a received ASI signal over an STL transport from studio and convert this ASI into SMPTE-310M as well as update the PSIP tables. Usually an STL signals introduces jitter making it difficult to the receiving end to lock to this signal, the PCR (Program Clock Reference) embedded within the transport stream, is used to synchronize a receiver's clock with an encoder's clock. The original PCR values that were stamped into the stream by the original encoder will not be the correct PCR values for the receiver after null packets are inserted into or deleted from the stream. Therefore the PCR values need to be re-stamped so that the receiver will have the correct PCR values, thus avoiding PCR clock jitter at the receiver end.

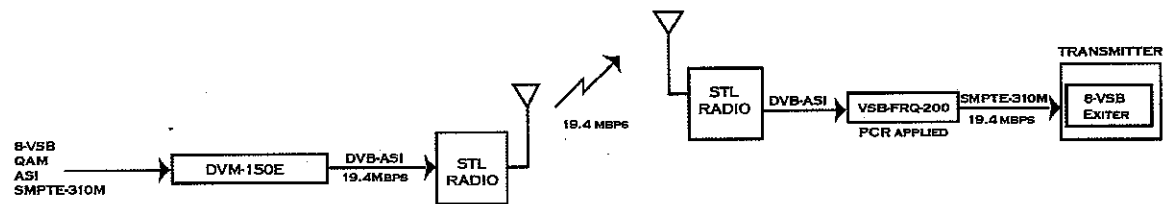


Figure 3: Application of the VSB-FRQ-200 for Studio to Transmitter

Front Panel

The front panel of the VSB-FRQ-200 is shown below in Figure 4.

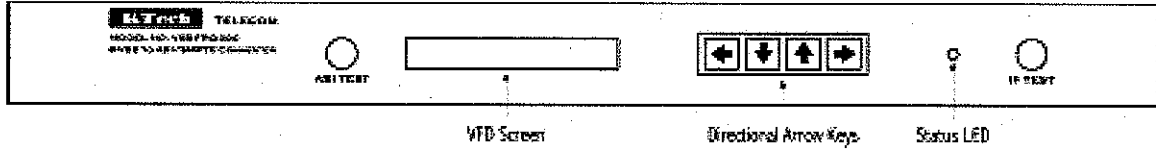


Figure 4: Front Panel of the VSB-FRQ-200

Signal	Connector
DVB-ASI Output Testpoint	BNC
IF Test	BNC

Back Panel

The back panel of the VSB-FRQ-200 is shown below in Figure 5.

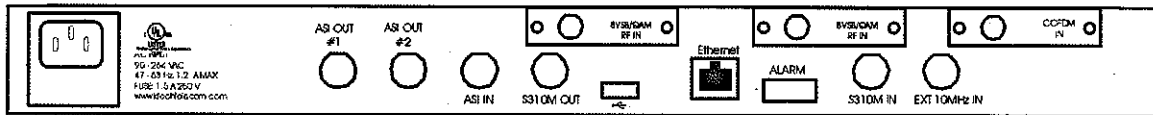


Figure 5: Back Panel of the VSB-FRQ-200

Signal	Connector
DVB-ASI Output #1	BNC
DVB-ASI Output #2	BNC
DVB-ASI Input	BNC
SMPTE-310M Output	BNC
ETHERNET	RJ45
USB	Type A
Alarm	3 terminal Phoenix
SMPTE-310M Input	BNC
RF Input	75Ω F

FRQ GUI Documentation

The purpose of the GUI is to have a remote controlling and monitoring system for the FRQ. The basic requirements of this system was that multiple computers running the GUI had to be able to access the FRQ from any remote location, and the FRQ must also deliver only the requested information to the individual computers. Once a GUI has established connection to the device via Ethernet, the GUI will request the device to send the device status to the client every 1000 ms. This is the only part of the system where the GUI will continue to request data automatically, without the user requesting to do so, all other information sent will be by GUI request.

This document will go through the functional description of each tab and button on the FRQ GUI, and will also go into a basic functional description of the FRQ network processor functions related to these buttons.

When you run the GUI the following screen will show up. As seen from connection status, there is no connection between GUI and the device. Therefore User needs to connect to device.

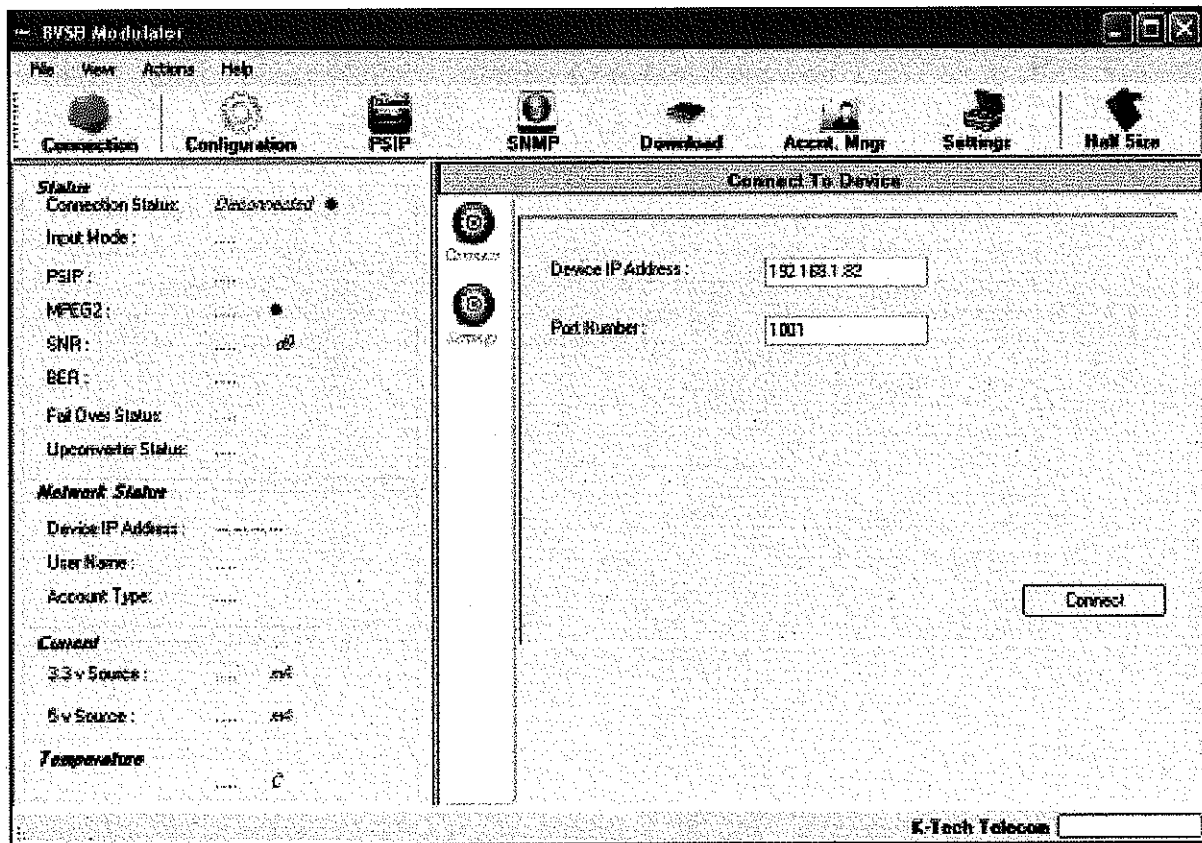


Image 1. FRQ GUI

Connecting to the FRQ

Before connecting to the FRQ through the GUI, make sure the FRQ is powered up and connected to Ethernet. Also make sure you have the IP address and port number of the device (FRQ) you are trying to connect to at hand. You can read and also change the IP address and port number of the device from front panel.

Click on the Connection button at the top of the GUI, and then click on the Connect tab on the screen that shows up. Image 1 above, shows this screen.

Enter the IP address and port number of the Device and click on the Connect button.

When the Connect button is clicked, the GUI will first disable the current form (the main screen) and then open the 'login' form, where you will be prompted for the user name and password in order to connect to the device. Following image shows the login screen.

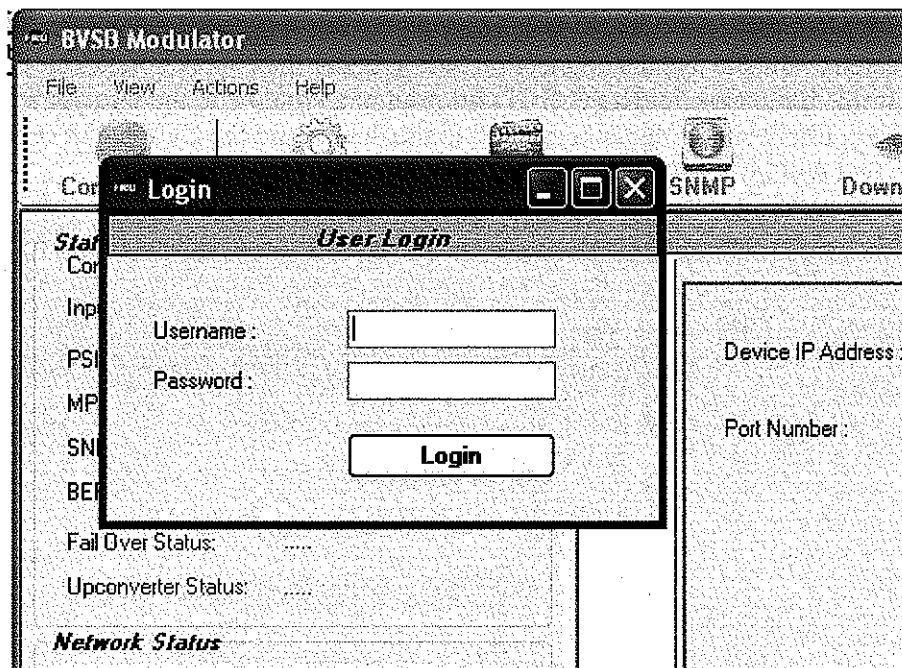


Image 2. Login Screen

If Username and Password are correct, the connection is successful, the Login screen will automatically close and you will see the main screen of the GUI once again. On this screen you will notice that the text next to the "Connection status" says connected and the light next to it will light up in green. Also the Connect button will change to "Disconnect". The left hand side of the GUI will be populated with periodically changing numerical data. This means that the GUI is now connected to the device and is receiving status information from the device. Also under network status, the GUI shows the name of user and account type. Account type is either administrator or Guest. A user with Admin capabilities can change settings and monitor the device, whereas a user with Guest access can only view status data of the device.

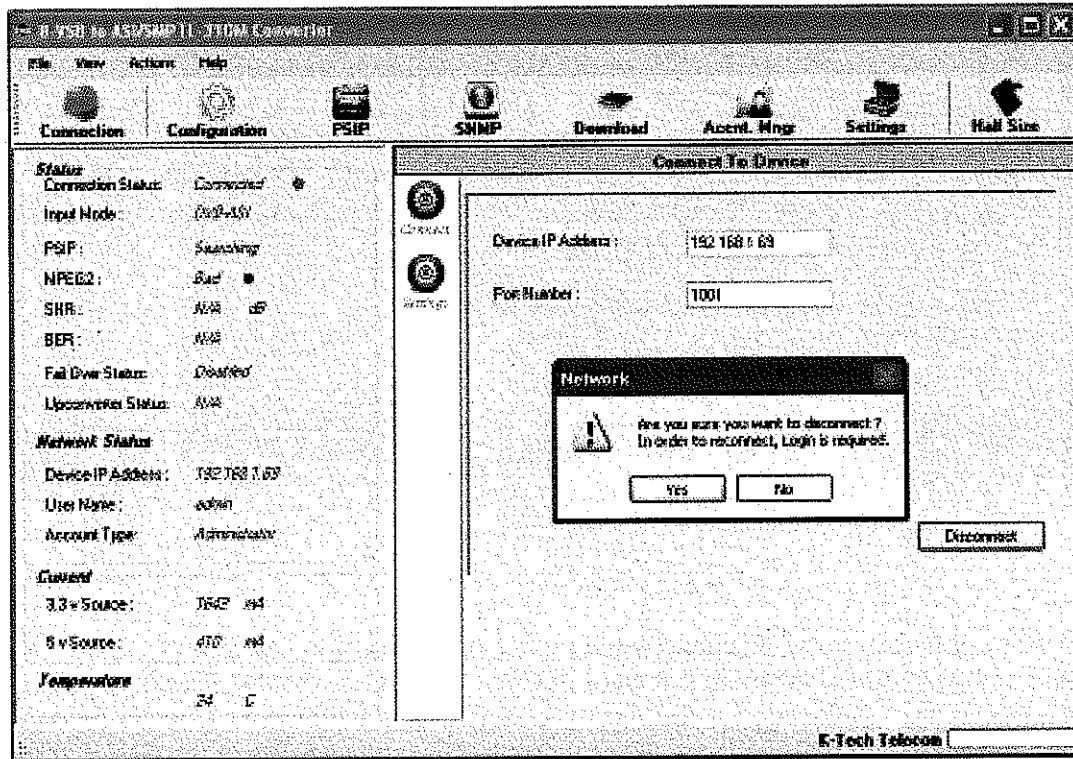
Username and Password are maximum 12 characters. If for any reason username and password are forgotten, you need to reset user accounts to the default by entering Username: "ktech21", password: "ktech21". In this case, a message ("The user account lists were reset.") will be appeared and all previous user accounts will be deleted and a default username will be added. (Default username: "admin" password: "admin") Now user can login using default username and password.

If Username and/or password are wrong, login will be failed and login form will prompt another request for user name and password from the user. If the number of incorrect attempts made to connect is more than 3, the GUI will lock the user. In order to login again, the GUI must be closed and open again.

If another user is already connected to the device with the same username and password, second user will not be allowed to connect. In this case, login screen shows an error message "The user is already logged in."

Disconnecting from the FRQ

If GUI is connected to the device, the connection button under the connection tab on the GUI will read "Disconnect". If this button is clicked the GUI will prompt a window to the user for a disconnect confirmation. Then it will send Logout command to the device and the GUI is disconnected. The Connect button text will be changed again, and so will all the other labels.



If the user closes the form without disconnecting, the GUI will disconnect first by sending a Logout command to the device and then will close the form. If the GUI is shut down suddenly for example by computer power shut down, the device will not receive Logout command, and still thinks the user is online. If the same user try login with the same user name and password, the login screen shows the

error message” The user is already logged in”. However after about 1 minute, device will recognize that user is offline and then user can login with no error.

Status panel

As soon as the GUI has established connection with the FRQ, the GUI update the status of the device every one second automatically.

Configuration

The Configuration tab enables a user to change either Input Configuration such as input channel, fail-over and etc or Advanced Configuration such Upconverter settings, Reference Clock and etc. The following image shows input Configuration.

The screenshot shows a window titled "Input Configuration". On the left side, there are two circular icons: the top one is labeled "Input" and the bottom one is labeled "Adv.". The main area of the window contains the following settings:

- Fail Over Enable
- Primary**
- Input Mode: RF1 (dropdown) Off Air (VHF/UHF) (dropdown)
- Channel #: 00 (text box)
- Switch to Secondary when Primary MPEG2 Bad for 10 seconds. (text box)
- Secondary**
- Input Mode: SMPTE-310M (dropdown)
- Switch back to Primary when Secondary MPEG2 Bad for 10 seconds. (text box)
- Switch back to Primary Manually Switch Back (button)
- Switch back to Primary when Primary SNR is more than 10 dB for 10 sec. (text boxes)

At the bottom right of the main area are two buttons: "Refresh" and "Apply". At the very bottom of the window, there is a logo for "K-Tech Telecom" and an empty text box.

When Fail-Over is enabled, user needs to define both Primary and Secondary input. However if uncheck Fail-Over Enable, Secondary input will be disappeared. Input mode could be SMPTE-310M, DVB-ASI, RF1 or RF2 depends if two or any tuner is installed into the device.

When MPEG2 in Primary input is bad for an amount time specified by the user, the input switches to the secondary input. There are 3 options to switch back to primary input. First option is when the MPEG2 of secondary is bad for a specific time. Second option is manual switch back. User can click

on the switch back button to go back to primary input. Third option is for the case that primary input has a good SNR more than some numbers during a specific time. Note that this option is available only when primary input is RF1 or RF2.

All settings on the input Configuration tab are submitted together when the apply button is clicked. Therefore, any changes made to any configuration settings will not take effect until the Apply button has been clicked.

When user clicks Refresh button, the input configuration will be updated in case the user changed setting through front panel.

In advanced configuration tab, user can define Reference Clock as Internal or External, Modulator Mode for IF out as Normal, PN mode or DC mode and enable or disable PCR correction.

In Pilot Adjustment, user can adjust the pilot frequency by +/- 35 kHz with 0.5 Hz step size.

The screenshot shows a software interface titled "Advanced Configuration". On the left side, there is a vertical menu with two gear icons. The top icon is labeled "Input" and the bottom icon is labeled "Adv.". The main area contains several configuration options:

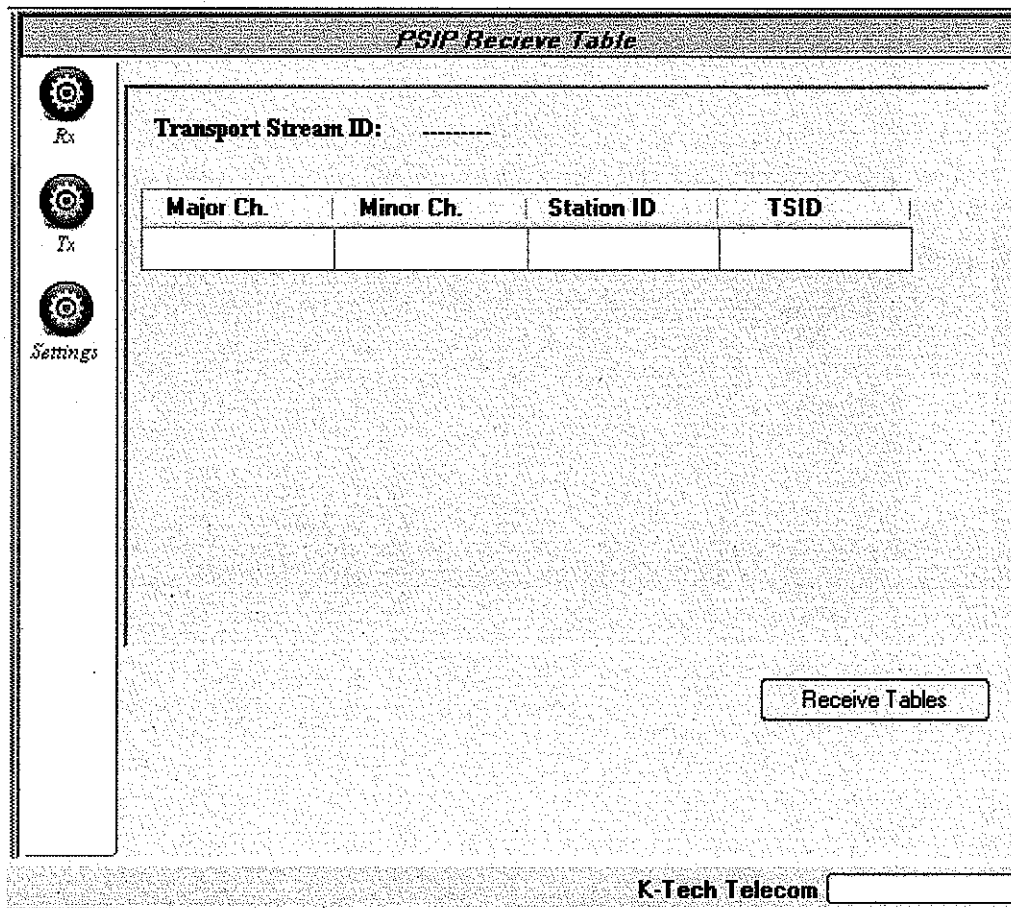
- Reference Clock: A dropdown menu.
- Modulator Mode: A dropdown menu.
- PCR Correction: A checkbox labeled "Enable" which is checked.
- Pilot Adjustment: A text input field containing "0.0" followed by "Hz" and two small arrow buttons for increment and decrement.
- Upconverter section:
 - Frequency: A text input field containing "707.000000" followed by "MHz".
 - Power: A text input field containing "50.0" followed by "dBmV" and a checkbox labeled "OFF" which is unchecked.

At the bottom right of the main area, there are two buttons: "Refresh" and "Apply". At the bottom of the window, there is a footer that says "K-Tech Telecom" followed by a small empty rectangular box.

PSIP Settings


Clicking on the PSIP menu button at the top of the GUI will open up the PSIP Menu tab. This tab will let the user view the PSIP Transport table and the PSIP Receive table; it will also permit the user to change the PSIP Settings such as Enabling PSIP updates and clearing the PSIP.


The following screen shows Receive table.




The receive table cannot be edited, however the user may choose to edit the transmit table by clicking on the individual cells in the PSIP Tx table and changing values. After a change has been made, in order for the change to take effect the user must first press the “Apply TX Table” button. When this button is clicked, the program will do the reverse of receiving the PSIP tables, this time it will send the current PSIP transmit table info back to the FRQ.

PSIP Transmit Table

 Rx

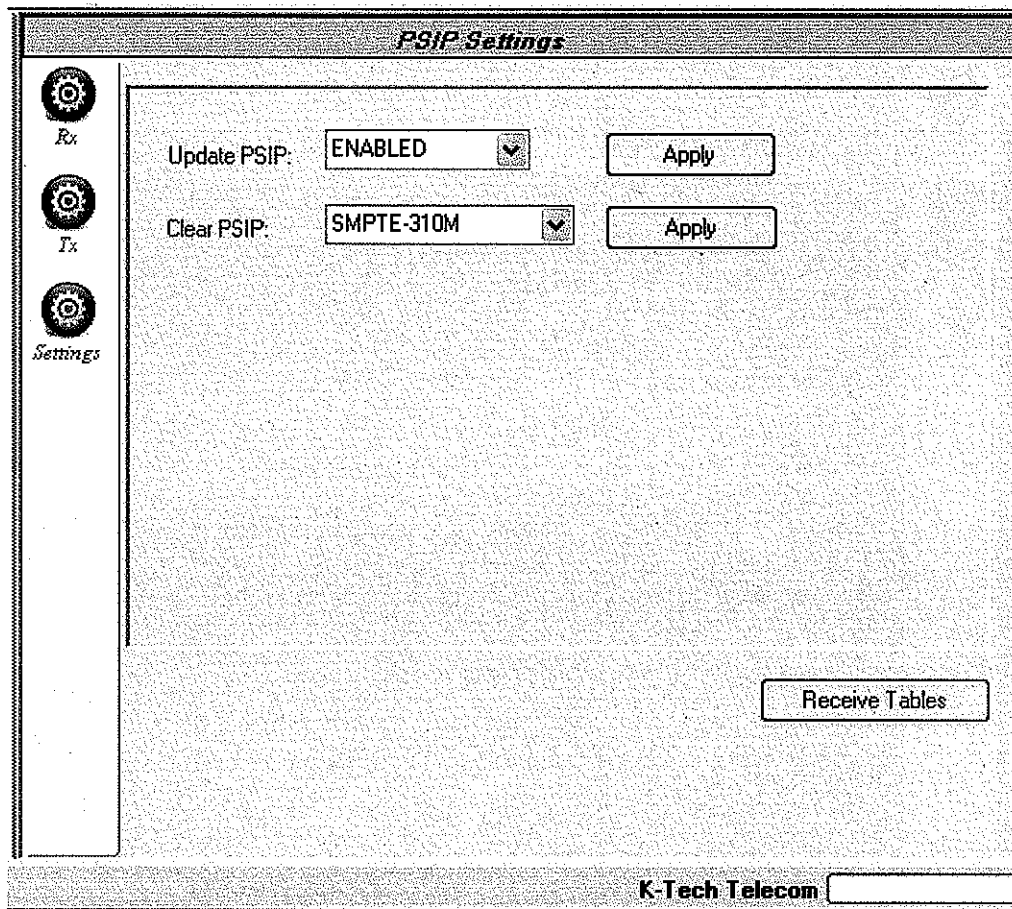
 Tx

 Settings

Transport Stream ID:

Major Ch.	Minor Ch.	Station ID	TSID
-----------	-----------	------------	------


K-Tech Telecom




SNMP Settings

The SNMP settings tab allows the user to enable SNMP trap messages, set the trap thresholds and the IP addresses to send the traps to. If an SNMP trap is enabled and a trap threshold has been violated the device will be able to send out a SNMP trap message to the specified IP addresses. As shown in the following screen, SNMP trap messages will be sent out to maximum 5 IP addresses.

SNMP IP Address Set

 IP

 Enable

IP 1: 192.168.0.101

IP 2: 192.168.0.102

IP 3: 192.168.0.103

IP 4: 192.168.0.104

IP 5: 192.168.0.105

K-Tech Telecom

SNMP Trap Enable menu shows the trap thresholds for the SNR, BER, Temperature and Current. Also it shows enable for ASI, RF1 and RF2 input.

The screenshot shows a configuration window titled "SNMP Trap Enable". On the left side, there are two gear icons, one labeled "IP" and one labeled "Enable". The main area contains several checkboxes and input fields:

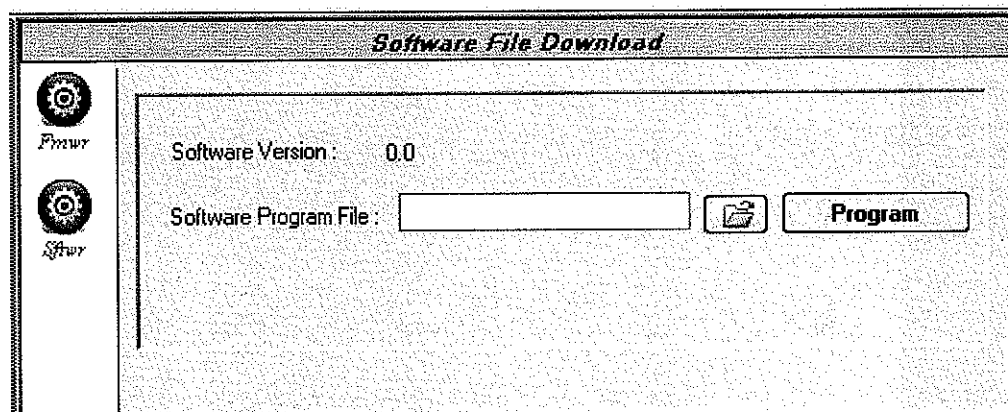
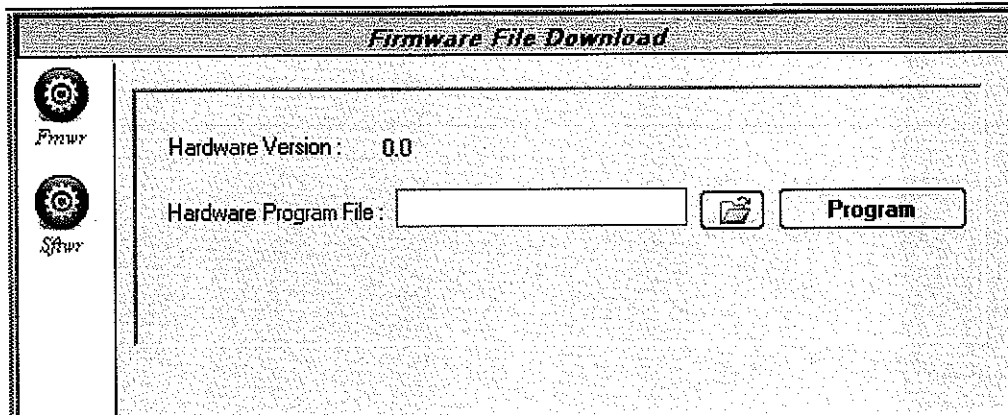
- ASI Link
- RF Link 1
- RF Link 2
- SNR Min: dB Max: dB
- BER Max: x 10⁻
- Temp. Max: C
- Current Max (3.3v): mA Max (5v): mA

At the bottom right, there are two buttons: "Refresh" and "Apply". The footer of the window shows "K-Tech Telecom" followed by a small empty box.

In order for the SNMP settings to take effect, the user must first click on the "Apply" button. When the Apply button is clicked, the button click sub routine will first check the validity of the trap thresholds entered for the SNMP traps that were enabled (if any) alert the user of any errors and if no errors found will start sending the SNMP settings to the device.

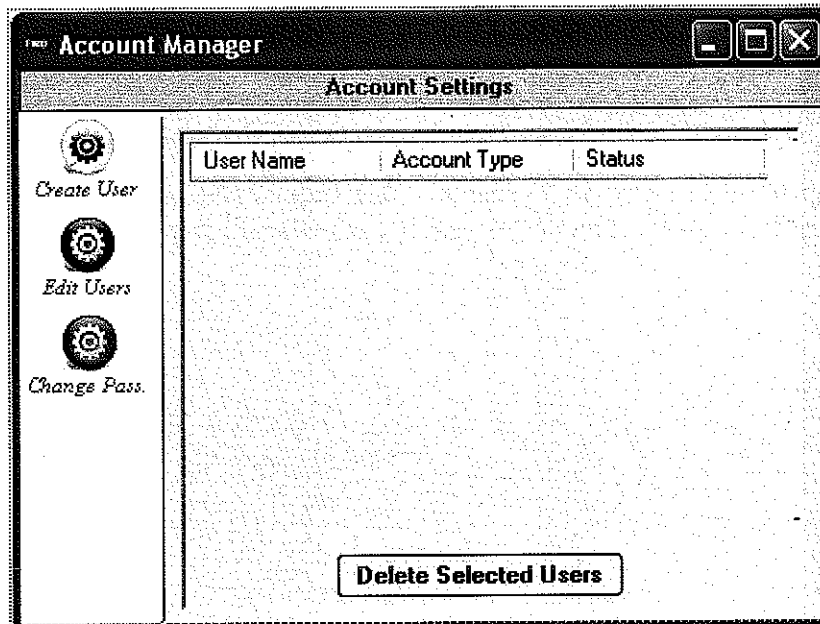
Download Firmware and Software

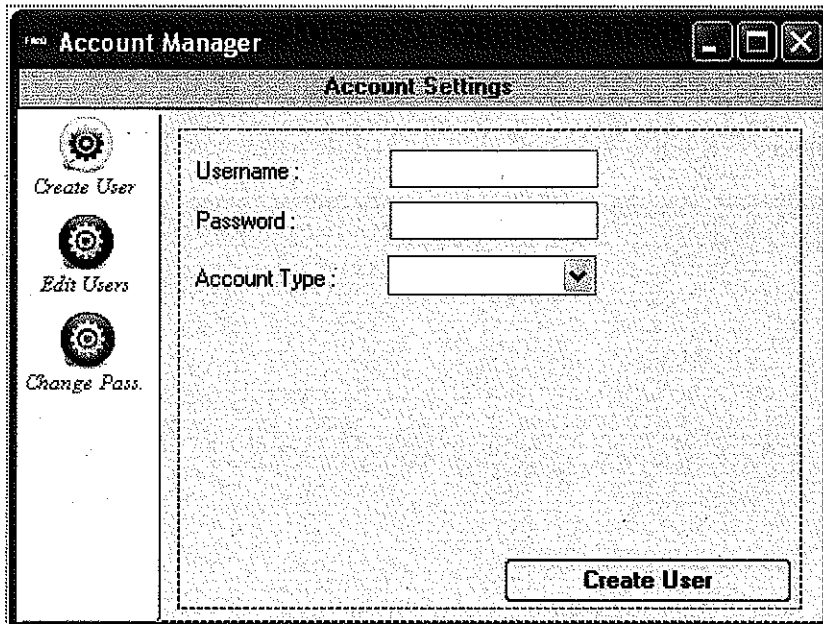
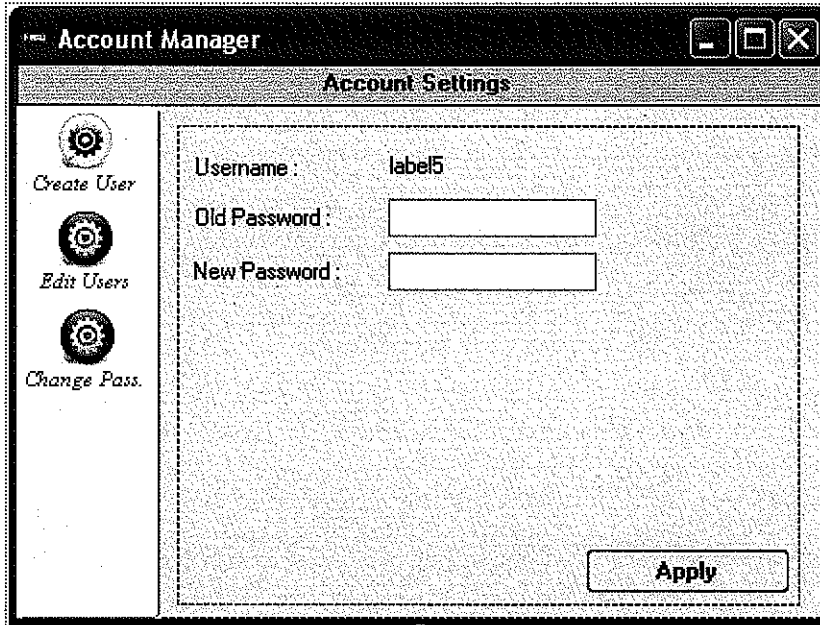
The SNMP settings tab allows the user to enable SNMP trap messages, set the trap thresholds and the IP addresses to send the traps to. If an SNMP trap is enabled and a trap threshold has been violated the device will



Account Manager

In this menu, user can edit current user accounts, remove any user account and also create a new user account.

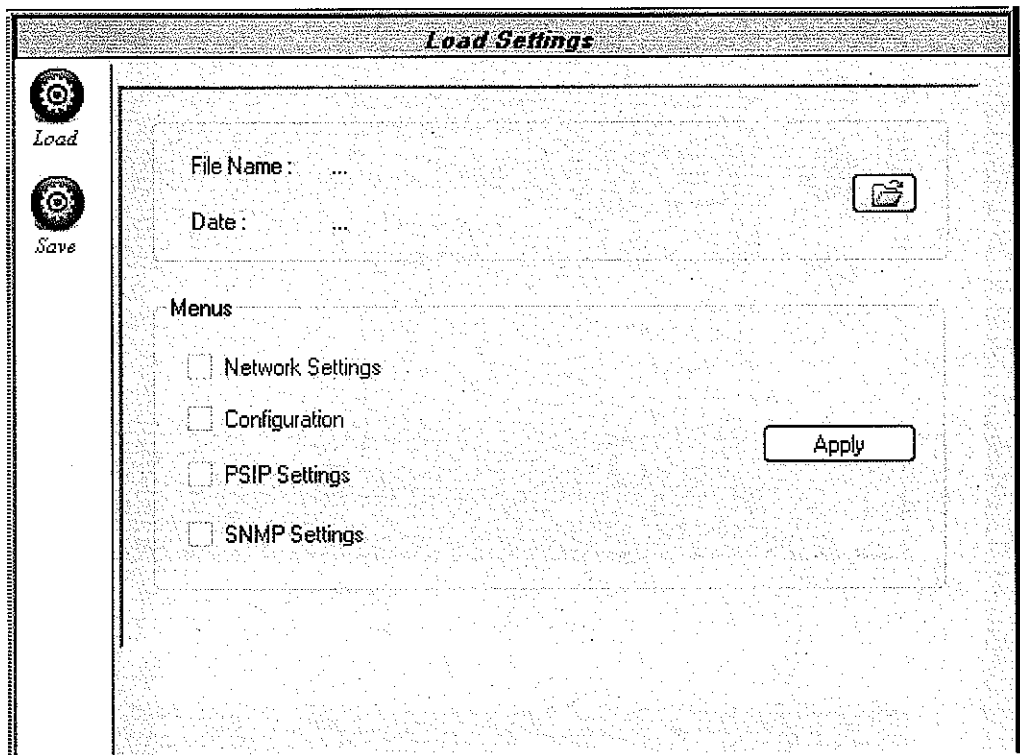




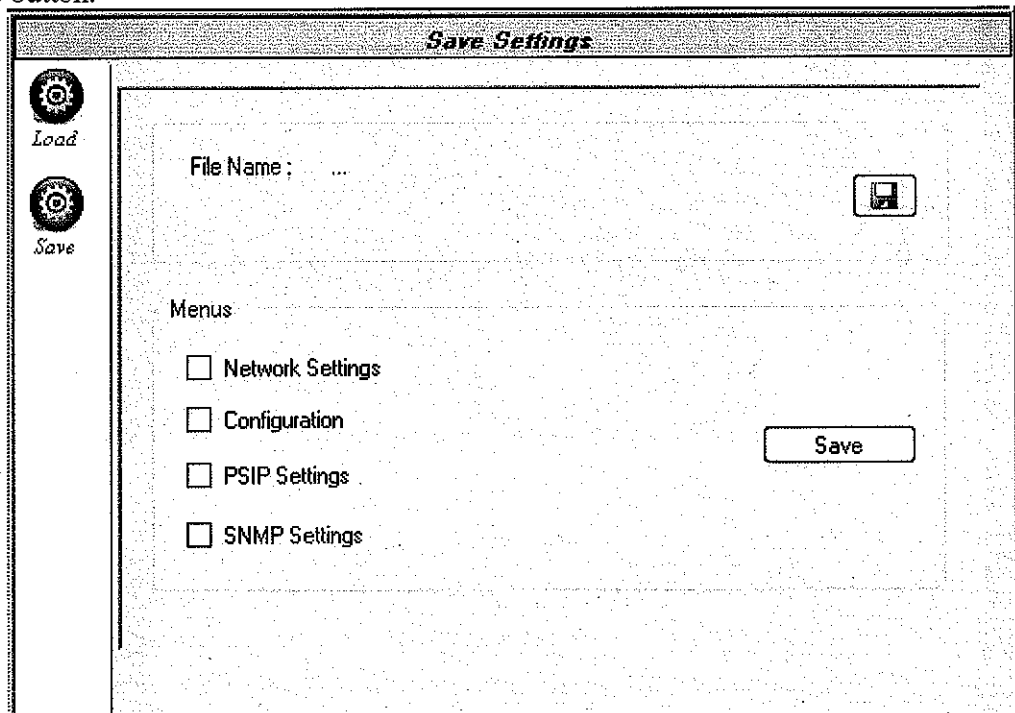
File Settings

In this menu, all configurations could be stored in XML file and also restore setting from an existing XML file. In Load Settings, first load the file by clicking on Load button. Then the GUI checks if the

XML file is in correct format and depends on information stored into the file, menus are going to be visible. User then can check any specific menu and click Apply to apply settings to the menus.



In Save Settings menu, first click Save button to define file name and then check menus and finally click Save button.



Specifications

General

Description	Range	Units
AC Power		
Frequency	47-63	Hz
Voltage	90-264	VAC
Current	1.2	Amp (max)
Operating Conditions		
Temperature	0-50	°C
Altitude	12,000	ft (max)
Humidity (non-condensing)	95	%
Materials		
Aluminum chassis		
Weight		
Net	10	lbs.
Gross (shipping)	13	lbs.
Dimensions		
Height	1.75	inches (1RU)
Width	19	inches
Depth	18	inches
Cooling		
Blower	Located on the left side towards the back of the unit	

RF Input Specifications

	Specification	Comments
Frequency	50-860 MHz	
USA Channel Numbers	2-69	
CATV Channel Numbers	1-125	
Impedance	75 ohms	
Connector	F	
RF Band	6.0 MHz	

Demodulator

Parameter	Specification	Comments
Mode	8-VSB Terrestrial	
Equalizer Span	-5.9 μ S to +40 μ S	
Data Rate	19.392658 Mbps	
SNR Threshold	15dB	

SMPT E310M Serial Interface (Baseband Data Input/Output)

Parameter	Specification	Comments
Connector	BNC	
Source Impedance	75 ohms	
Output Coupling	AC	AC inductively coupled
Signal Overshoot	<10%	
Data Format	Biphase Mark Coding	
Transport Stream Bit Rate	19.39265 Mbps	Raw serial data rate \pm 2.8 ppm

DVB-ASI Serial Interface (Baseband Data Input/Output)

Parameter	Specification	Comments
Connector	BNC	
Source Impedance	75 ohms	
Output Coupling	AC	AC inductively coupled
Transport Stream Bit Rate (input)	2.6 Mbps Min 45 Mbps Max	
Transport Stream Bit-Rate (output)	19.39265 Mbps	

PSIP Update

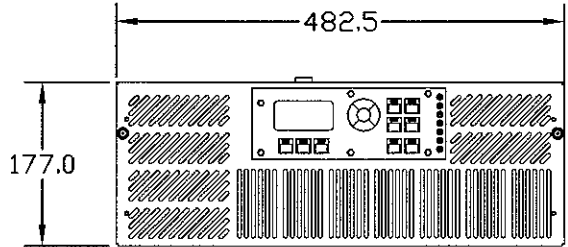
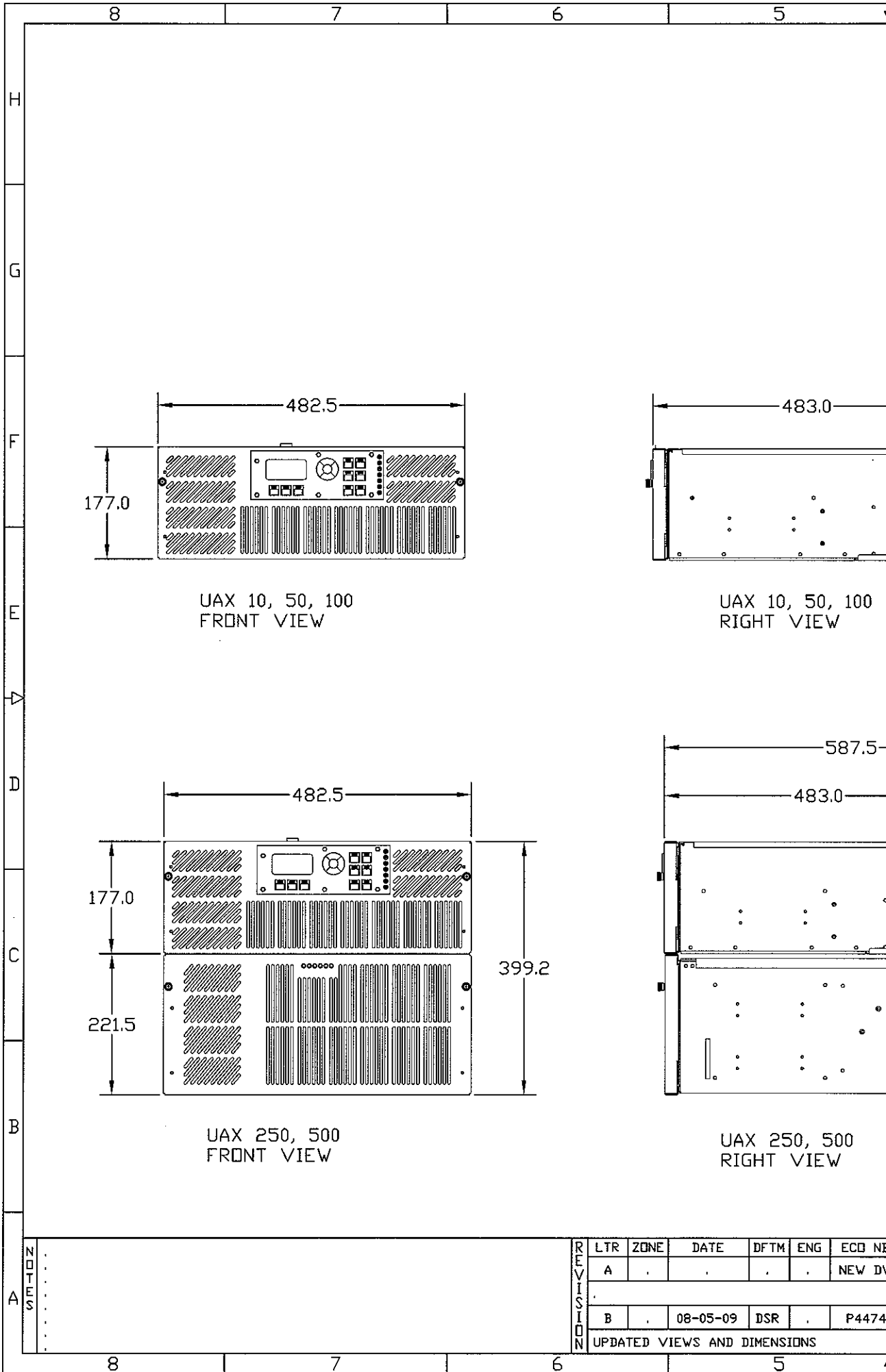
Parameter	Specification	Comments
Station Identification	Up to seven letters	
Major Channel Number	# 2-69	
Minor Channel Number	# 0-9	

Ordering Information

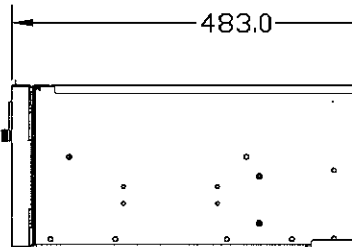
Part Number	Description
VSB-FRQ-200	8-VSB RF to DVB-ASI/SMPTE-310M Converter

Additional Information at KTech Web Site: www.ktechtelecom.com
For Pricing and Delivery information: sales@ktechtelecom.com

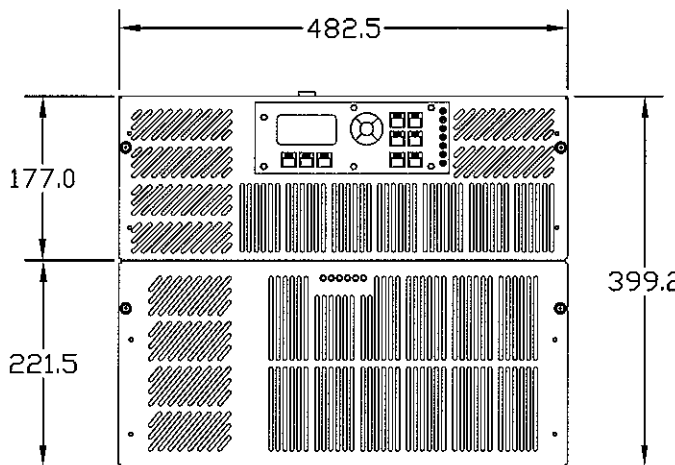
K T e c h TELECOMMUNICATIONS, INC.
DTV BROADCAST PRODUCTS
21540 Prairie St., Unit B
Chatsworth, CA 91311
Phone (818) 773-0333 Fax (818) 773-8330



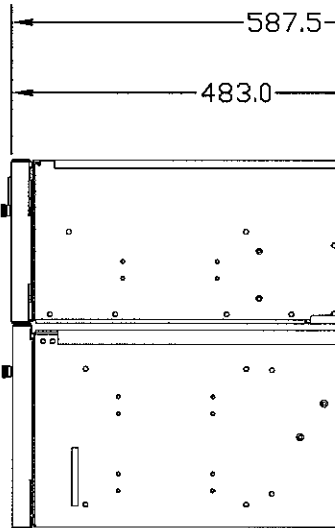
UAX 10, 50, 100
FRONT VIEW



UAX 10, 50, 100
RIGHT VIEW



UAX 250, 500
FRONT VIEW

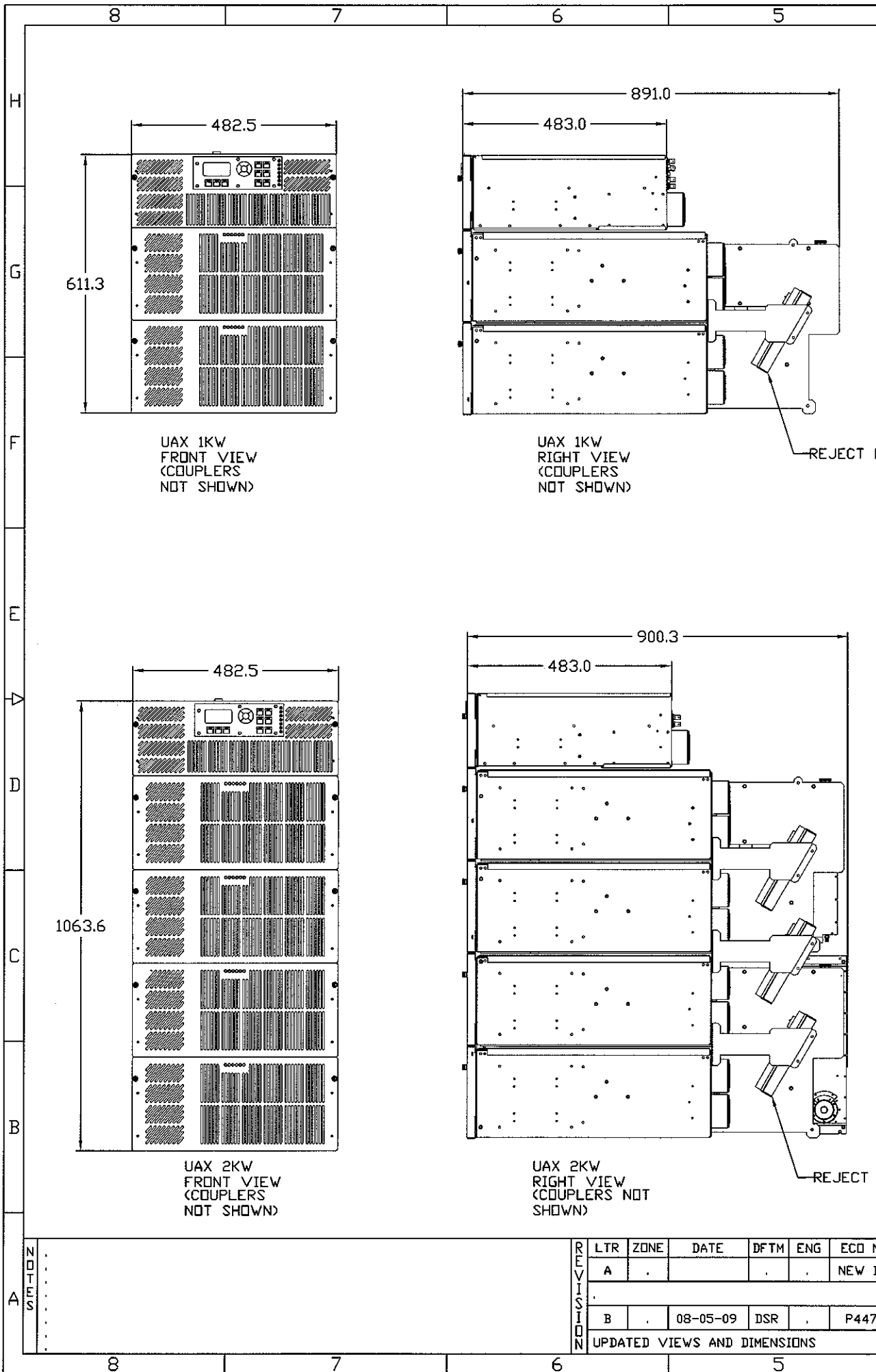


UAX 250, 500
RIGHT VIEW

NOTES
A

REVISION	LTR	ZONE	DATE	DFTM	ENG	ECD NR
A	NEW DV
B	.	.	08-05-09	DSR	.	P4474

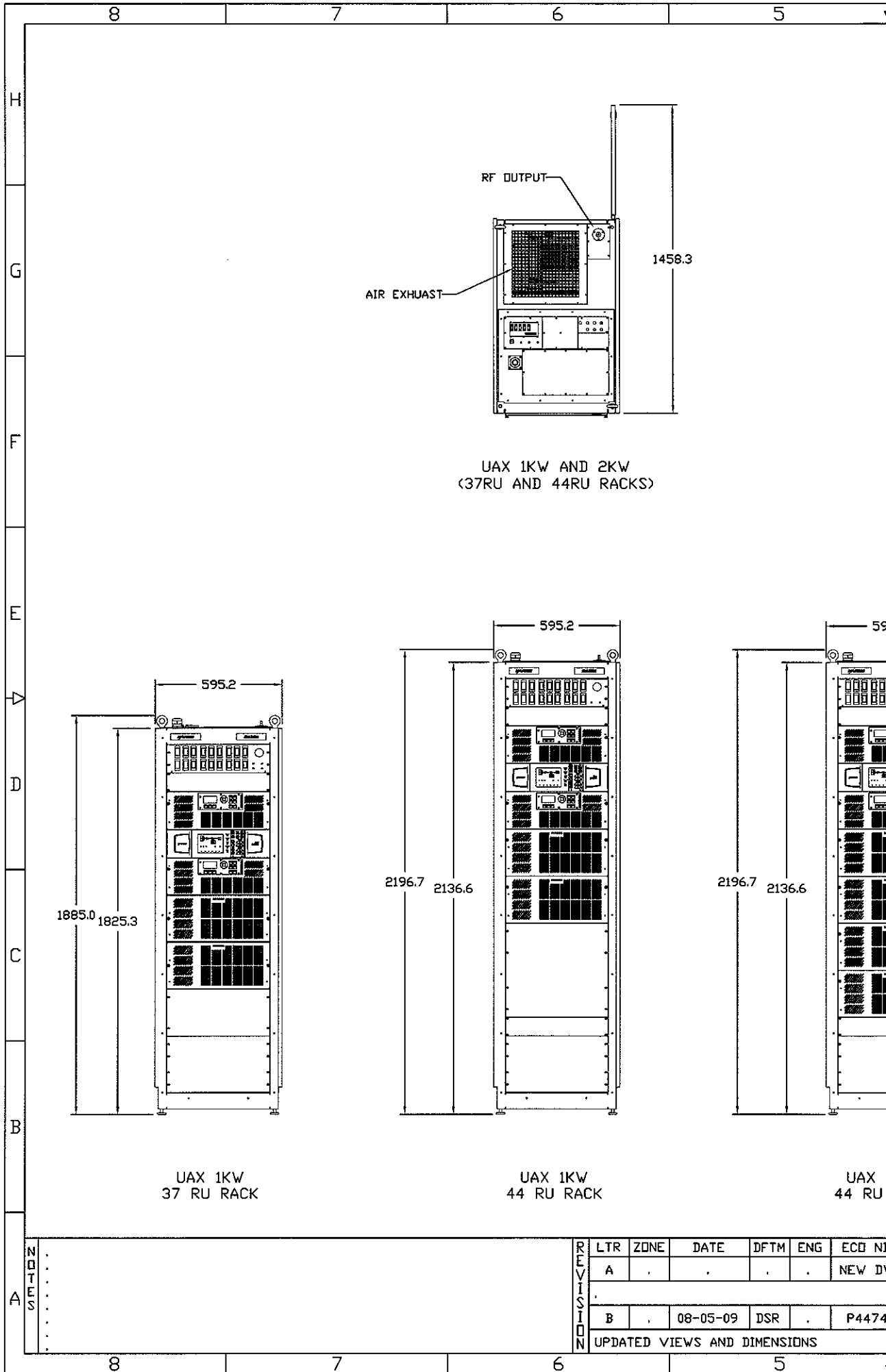
UPDATED VIEWS AND DIMENSIONS



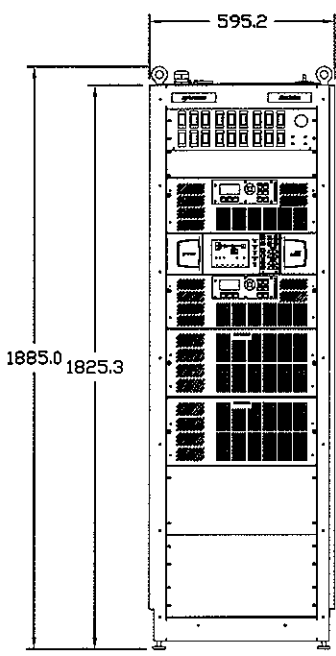
NOTES
A

REVISION	LTR	ZONE	DATE	DFTM	ENG	ECD N
A	NEW D
B	.	.	08-05-09	DSR	.	P4474

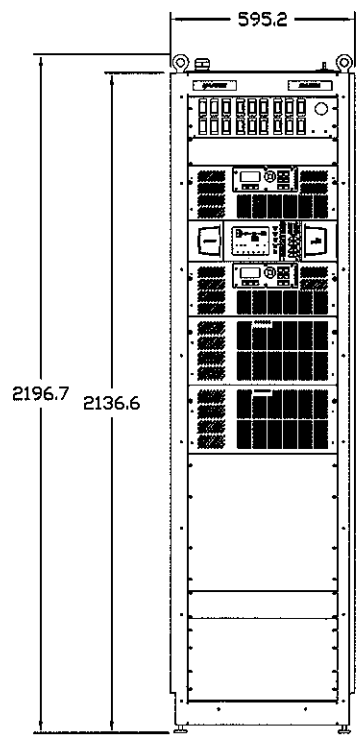
UPDATED VIEWS AND DIMENSIONS



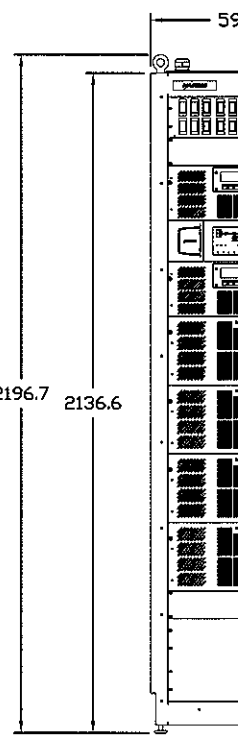
UAX 1KW AND 2KW
(37RU AND 44RU RACKS)



UAX 1KW
37 RU RACK



UAX 1KW
44 RU RACK



UAX
44 RU

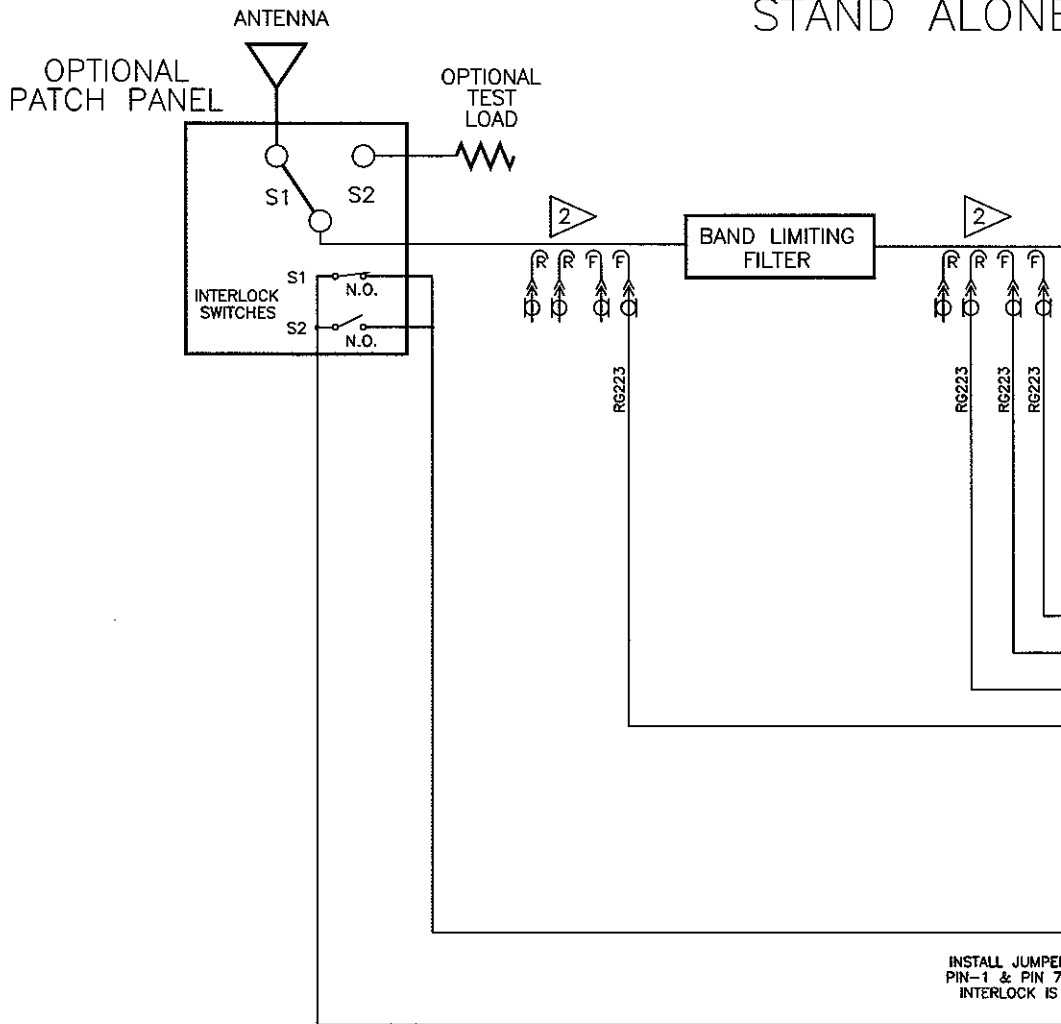
NOTES

REVISION

LTR	ZONE	DATE	DFTM	ENG	ECB NI
A	NEW DV
B	.	08-05-09	DSR	.	P4474

UPDATED VIEWS AND DIMENSIONS

STAND ALONE



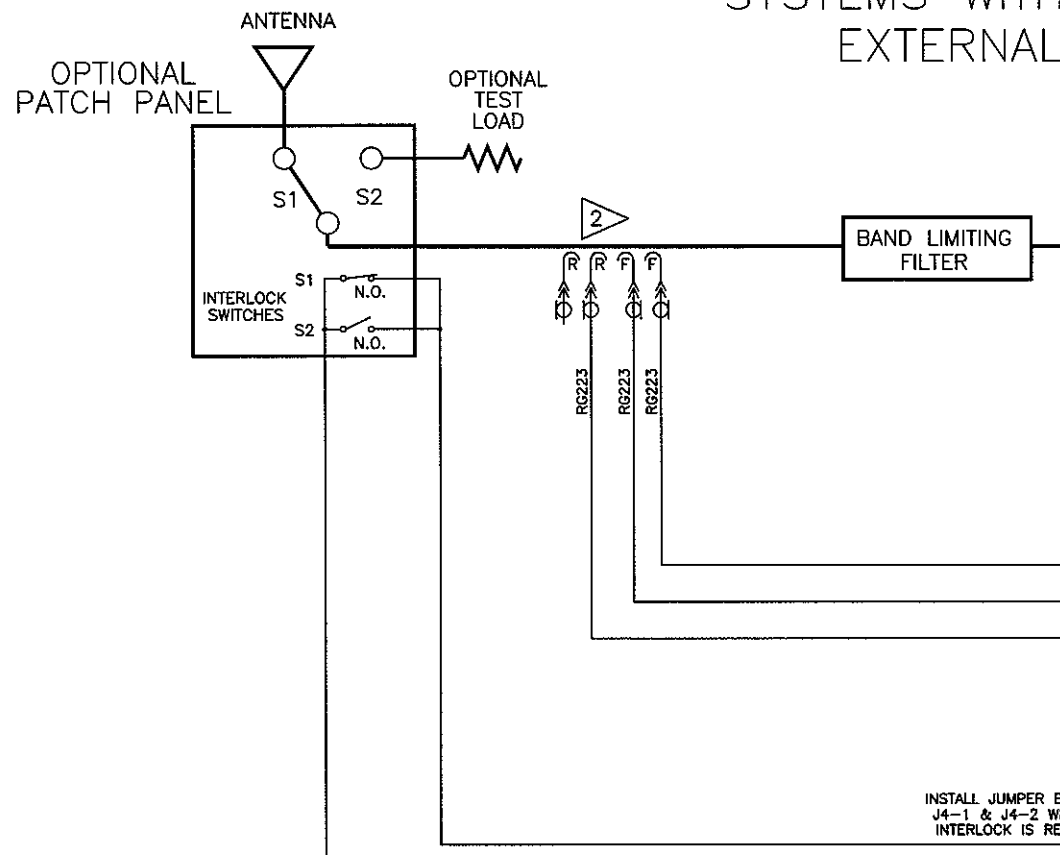
INSTALL JUMPER
PIN-1 & PIN 7
INTERLOCK IS

DIGITAL FWD (Watts)	Coupling FWD	Coupling RFLD	FWD Power PAD	RFLD Power PAD	RTAC PADS
10	35	29	6	2	6
50	35	29	12	9	12
100	35	29	15	12	15
250	46	32	7	12	7
500	46	32	10	15	10
1000	51	37	10	15	10
2000	54	40	10	12	10

NOTES

REVISION	LTR	ZONE	DATE	DFTM	ENG	ECD N
	C		7-30-09	DN	PM	P446
FWD & REFLD PWR BEFORE FILTER.						
	D	.	8-26-09	DN	PM	P449
REVISE LINE SIZE 1KW.						

SYSTEMS WITH EXTERNAL



INSTALL JUMPER BE
J4-1 & J4-2 WH
INTERLOCK IS REC

2

DIGITAL FWD (Watts)	Coupling FWD	Coupling RFLD	RTAC PAD
10	35	29	6
50	35	29	12
100	35	29	15
250	46	32	7
500	46	32	10
1000	51	37	10
2000	54	40	10

NOTES
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REVISION	LTR	ZONE	DATE	DFTM	ENG	ECD N
C			7-30-09	DN	PM	P446
FWD & REFLD PWR BEFORE FILTER.						
D			8-26-09	DN	PM	P449
REVISE LINE SIZE 1KW.						

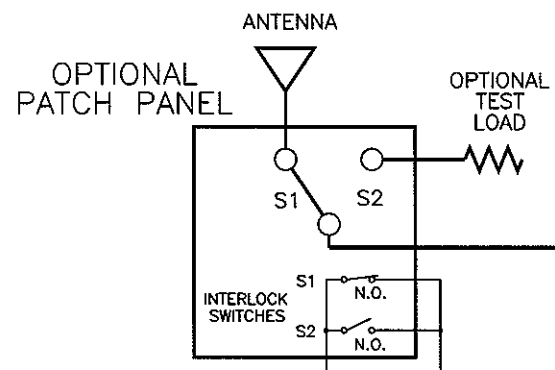
8

7

6

5

SYSTEMS WITH INTERNAL



INSTALL JUMPER BE
J4-1 & J4-2 WH
INTERLOCK IS REC

D

C

B

A

NOTES

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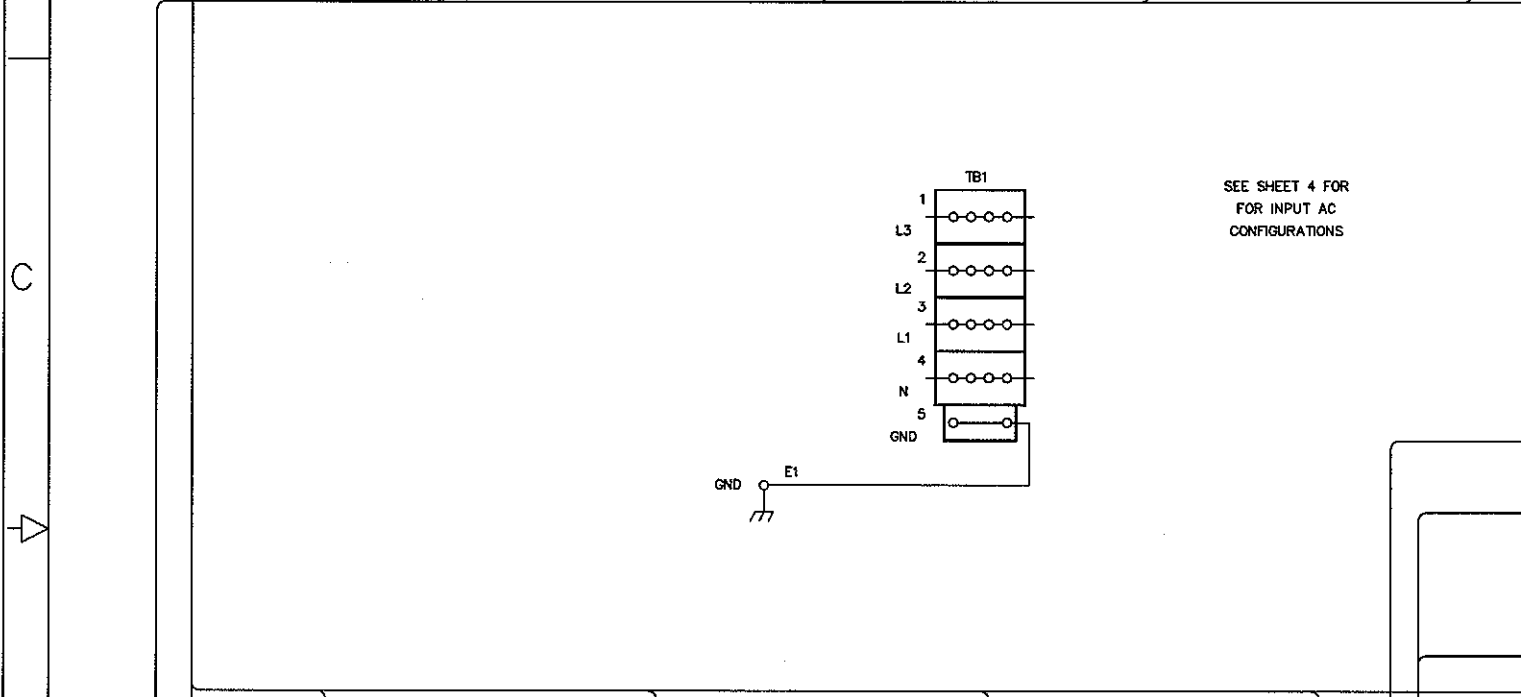
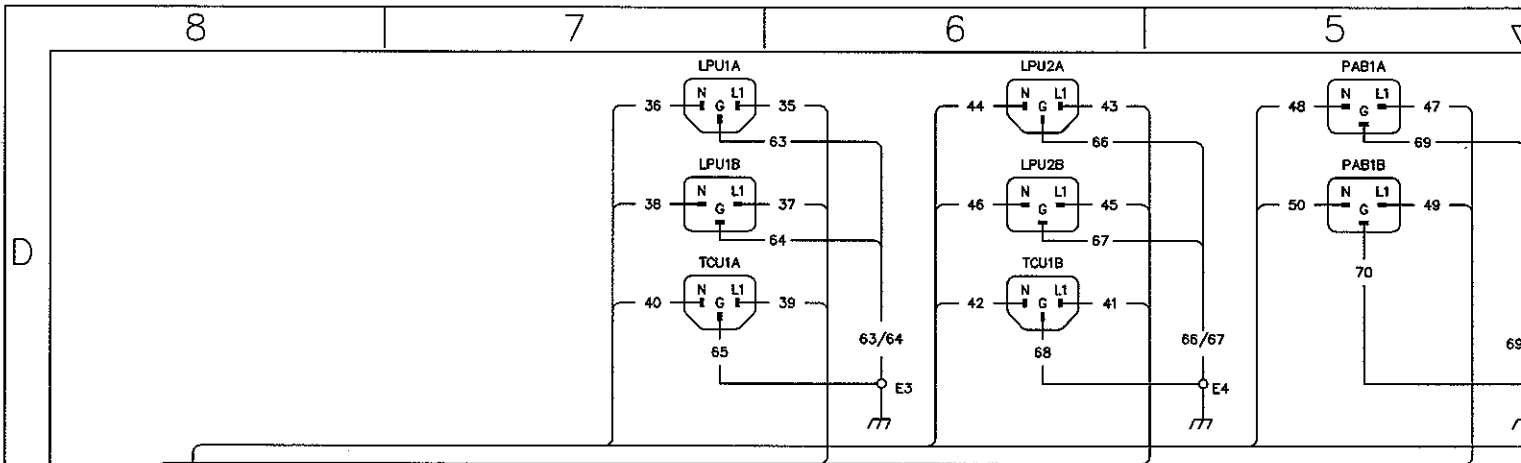
REVISION	LTR	ZONE	DATE	DFTM	ENG	ECD N
	C		7-30-09	DN	PM	P446
FWD & REFLD PWR BEFORE FILTER.						
	D	.	8-26-09	DN	PM	P449
	REVISE LINE SIZE 1KW.					

8

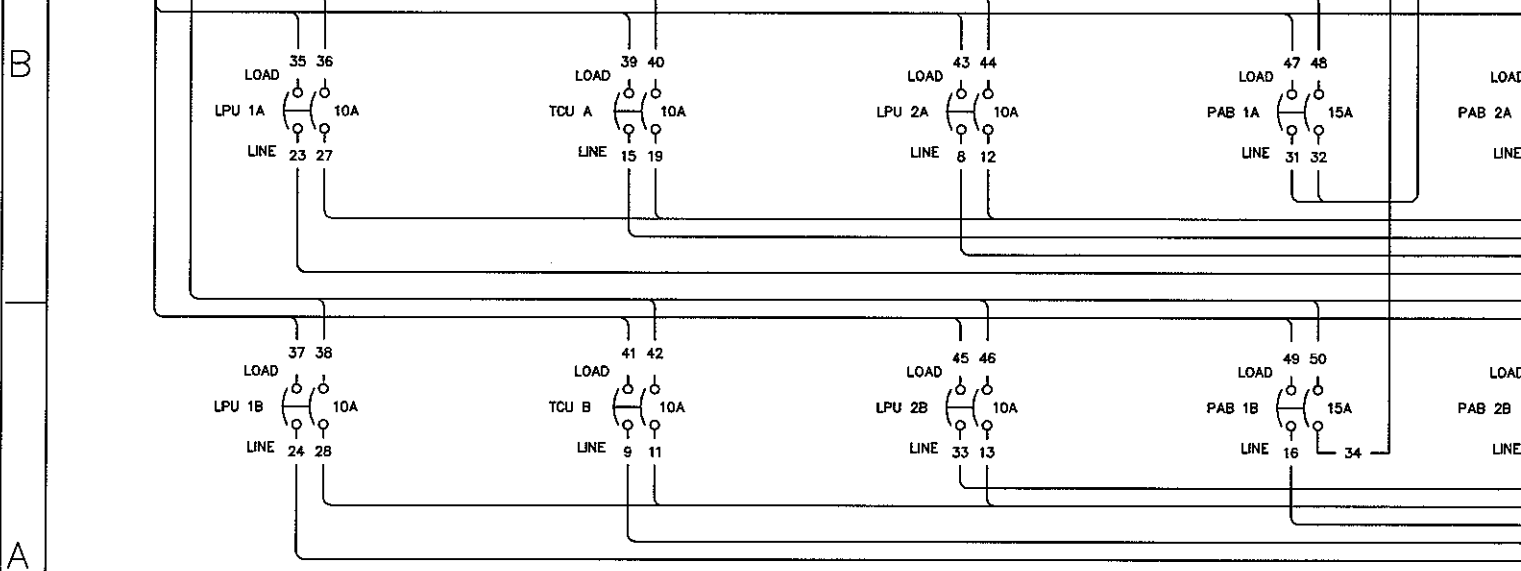
7

6

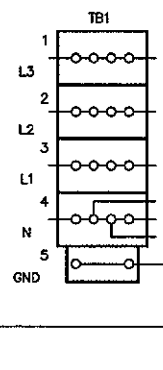
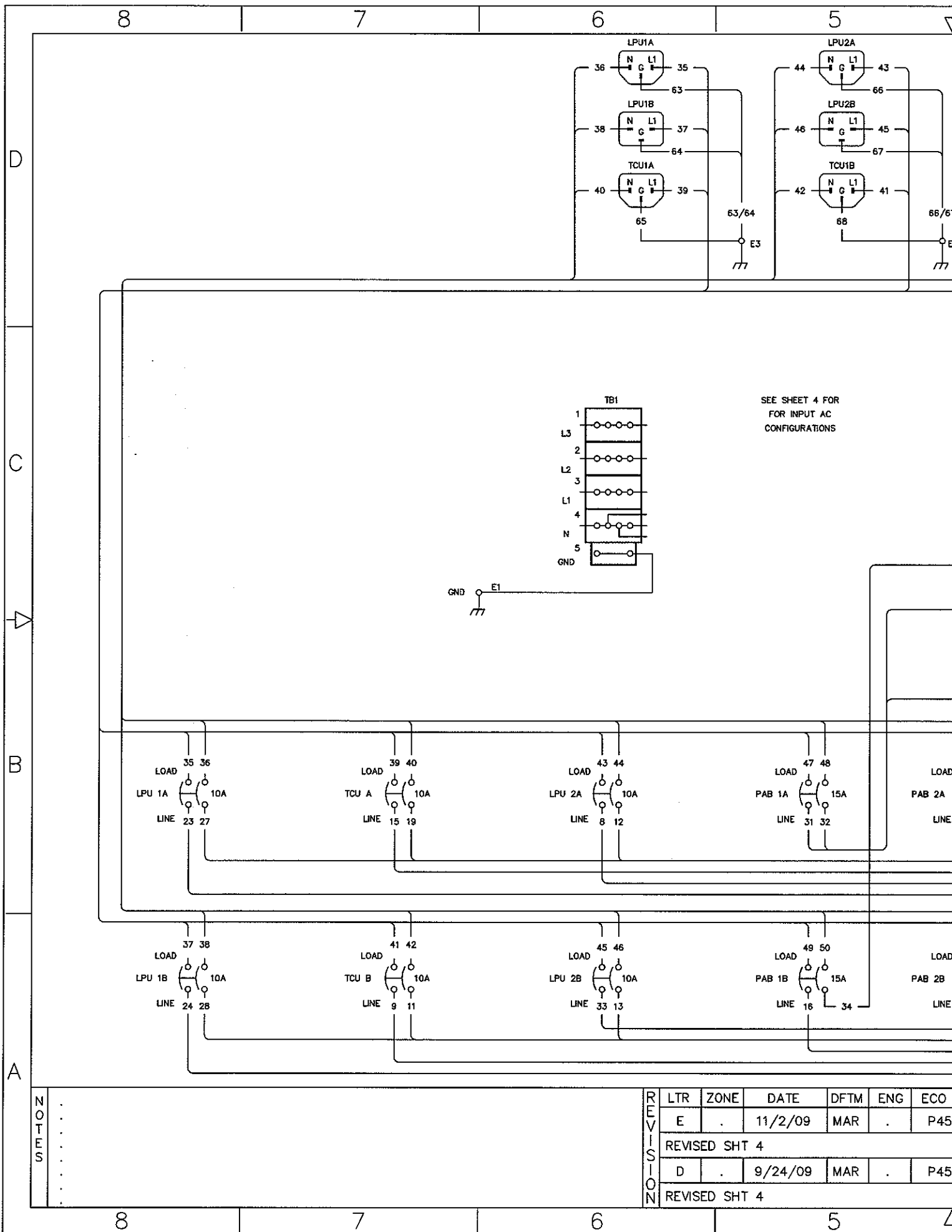
5



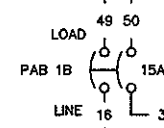
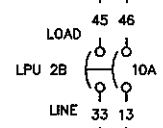
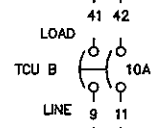
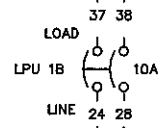
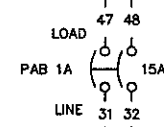
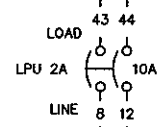
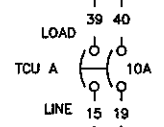
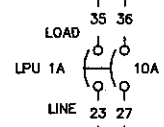
SEE SHEET 4 FOR
FOR INPUT AC
CONFIGURATIONS



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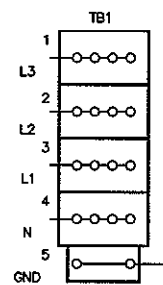
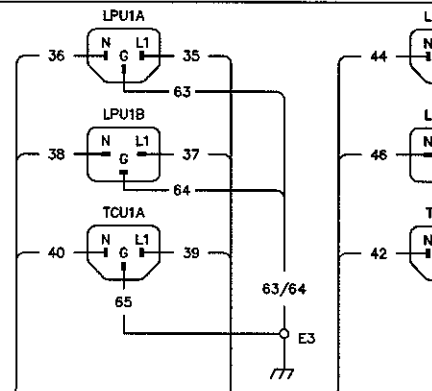
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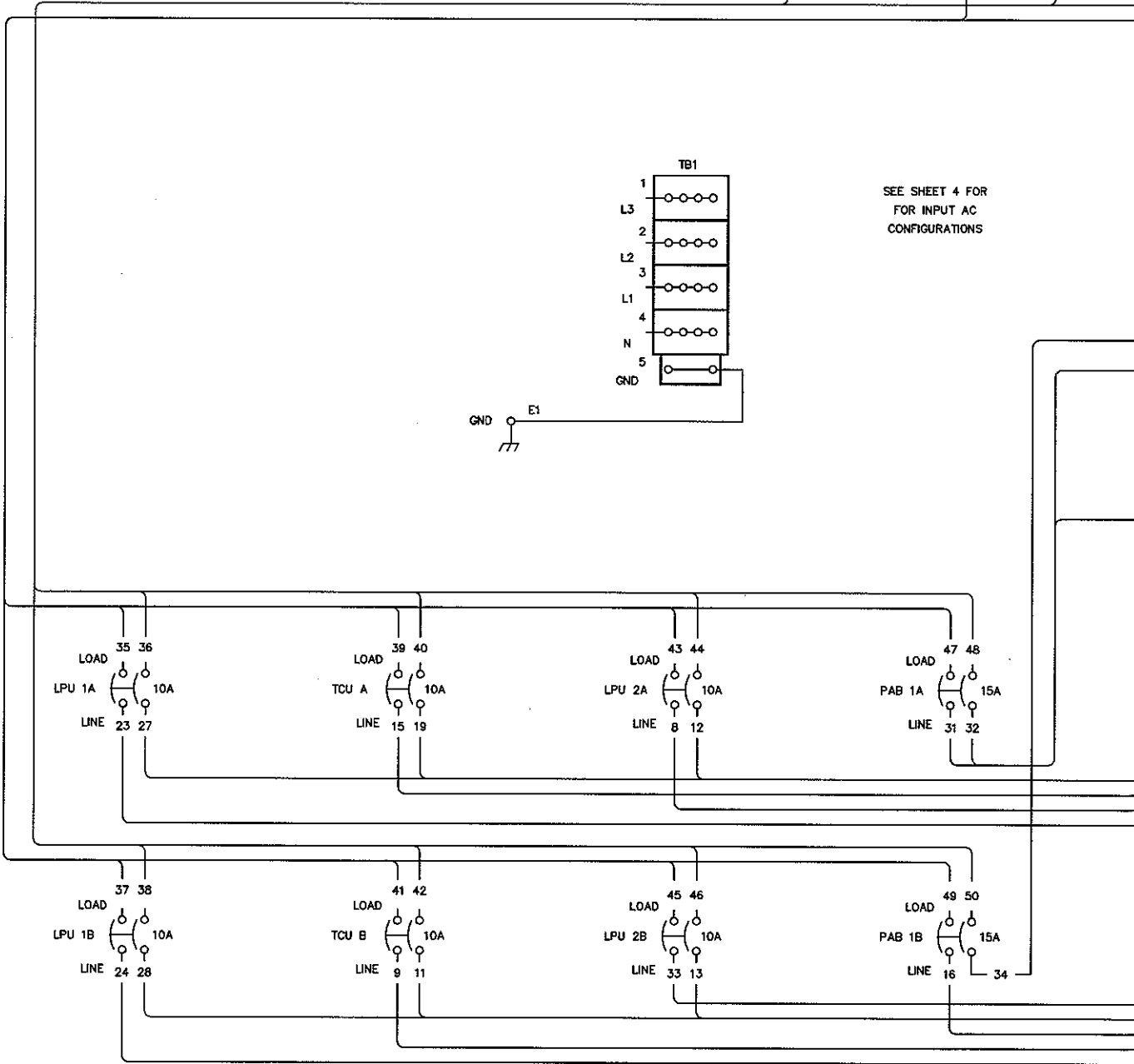
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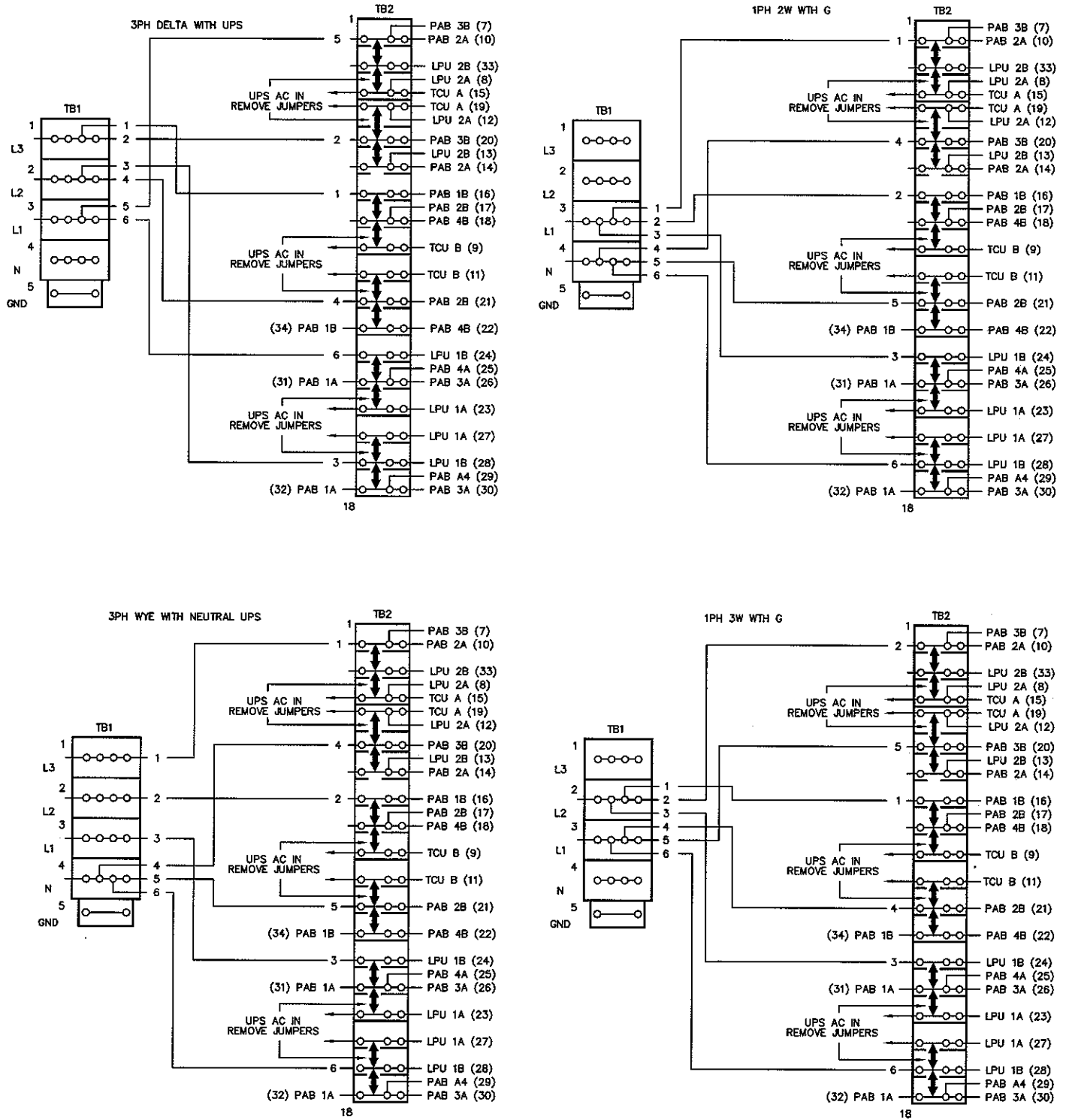
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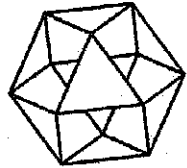
1 AND 2KW INPUT AC WIRING



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REVISED SHT 4						

ISO 9001 Certification

**NSAI**

Certificate of Registration
of Quality Management System
to I.S. EN ISO 9001:2008

The National Standards Authority of Ireland certifies that:

Harris Corporation

**4393 Digital Way
Mason, OH 45040
USA**

**3200 Wismann Lane
Quincy, IL 62305
USA**

has been assessed and deemed to comply with the requirements of
the above standard in respect of the scope of operations given
below:

**The Design, Sale, Manufacture, and Service of
Radio, Television, and Networking products for
use in Broadcast Communications and related
media industries.**

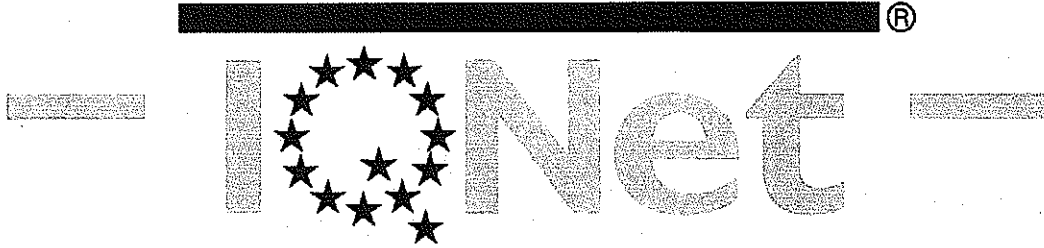
Approved by:
Kevin D. Mullaney
Chief Executive Officer

Approved by:
Alfred Au
Operations Manager

Registration Number: 19.1841
Certification Granted: Dec 22, 1994
Effective Date: Mar 04, 2010
Expiry Date: Mar 03, 2013



National Standards Authority of Ireland, 402 Amherst Street, Nashua, New Hampshire, NH 03063, USA T +1 603 882 4412



THE INTERNATIONAL CERTIFICATION NETWORK
IQNet and NSAI hereby certify that the organization

Harris Corporation

4393 Digital Way
Mason, OH 45040
USA

3200 Wismann Lane
Quincy, IL 62305
USA

for the following range of activities

**The Design, Sale, Manufacture, and Service of Radio, Television, and
Networking products for use in Broadcast Communications and related
media industries.**

has implemented and maintains a
Management System

which fulfills the requirements of the following standard

I.S. EN ISO 9001:2008

Registration Number: IE-19.1841
Registration Date: Aug 27, 2001
Last Amended on: Mar 04, 2010
Remains valid until: Mar 03, 2013

Signed:

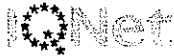
René Wasmer
President of IQNet

Signed:

Kevin D. Mullaney
Chief Executive Officer - NSAI

Issued on March 04, 2010

The validity of this certificate is maintained through on-going surveillance inspections.



National Standards Authority of Ireland, Santry, Dublin 9, Ireland



IQNet Partners*:

AFNOR Certification France AIB-Vincotte International Belgium ANCE Mexico APCER Portugal CISQ Italy
CQC China CQM China CQS Czech Republic Cro Cert Croatia DQS Holding GmbH Germany DS Denmark ELOT Greece
FCAV Brazil FONDONORMA Venezuela HKQAA Hong Kong China ICONTEC Colombia IMNC Mexico Inspecta Certification Finland
IRAM Argentina JQA Japan KFQ Korea MSZT Hungary Nemko AS Norway NSAI Ireland PCBC Poland
Quality Austria Austria RR Russia SII Israel SIQ Slovenia SIRIM QAS International Malaysia BQS Switzerland SRAC Romania
TEST St Petersburg Russia TSE Turkey YUQS Serbia

IQNet is represented in the USA by: AFNOR Certification, CISQ, DQS Holding GmbH and NSAI Inc.

* The list of IQNet partners is valid at the time of issue of this certificate. Updated information is available under www.ianet-certification.com

Corporate Overview

Harris Broadcast Communications is a division of Harris Corporation (NYSE: HRS), an international communications and information technology company serving government and commercial markets in more than 150 countries. Headquartered in Melbourne, Florida, the company has approximately \$5 billion of annual revenue and more than 15,000 employees — including nearly 7,000 engineers and scientists. Harris is dedicated to developing best-in-class *assured communications*® products, systems, and services. Additional information about Harris Corporation is available at www.harris.com.

The corporation has three divisions serving government and commercial customers.

RF Communication

Tactical Communications serves the U.S. Department of Defense, international militaries and government agencies with a comprehensive line of secure radios and systems.

Harris Public Safety and Professional Communications is a leading supplier of *assured communications*® systems and equipment for public safety, federal, utility, commercial and transportation markets – with products ranging from the most advanced IP voice and data networks, to industry leading multiband, multimode radios, to public safety-grade broadband video and data solutions.

Government Communications

Harris Defense Programs business is a major developer, supplier and integrator of communications and information processing products, systems and networks for a diverse base of aerospace, terrestrial and maritime programs.

The Harris Civil Programs business provides precise, highly reliable, high-speed communications and information networks that improve productivity and information processing for federal agencies of the U.S. government including the Federal Aviation Administration, U.S. Census Bureau, National Oceanic and Atmospheric Administration, Department of Homeland Security and the Government Printing Office.

Harris Nation Intelligence, surveillance and reconnaissance (ISR) solutions improve situational awareness, data collection accuracy and product analysis by correlating near real-time mission data for display and analysis. Our systems help to integrate information across the analyst workflow, accelerating the movement of information that has been collected and processed.

Integrated Network Solutions

Information Technology Services is a leading provider of IT and communications services to defense, intelligence, homeland security and civil customers.

Cyber Solutions design, development, and integration of full information infrastructures and communications systems to the production of discrete products within information and communications architectures. The company specializes in efficient use of COTS intensive approaches to solving these types of systems-level challenges.

Harris Healthcare Solutions provides enterprise intelligence solutions and services for commercial and government customers, including interoperability, imaging, managed services infrastructure, systems and cyber integration, and informatics. Harris products, systems, and services improve health outcomes by ensuring that the right information is delivered with security and privacy to the right person, on the right device, at the point of care.

CapRock delivers world-class communications to customers with critical operations anywhere in the world. From remote sites requiring reliable satellite communications to critical facilities demanding secure network services, CapRock has the solution. With over 27 years of experience, CapRock has become the premier provider of extremely dependable solutions and unparalleled customer service.



Broadcast Communications Division

One Company. One Direction. The Future.

Turn on a television or a radio almost anywhere in the world. Chances are excellent that the signal you receive is being broadcast with hardware from Harris Corporation's Broadcast Communications Division. Indeed, since Harris Broadcast Communications was founded in 1922, the company has become a leader in the global markets it serves, providing products, systems and services to customers in more than 150 countries. Harris is regarded as one of the world's foremost developers and manufacturers of analog and television transmission systems with well over 70 major technological "firsts" including many world standards that have literally changed the way our world sees and hears itself.

Over the last year, Harris has invested more than US\$800 million to expand and develop its broadcast offering. The company is committed to the broadcast industry and focused on helping customers succeed as they transition to the digital media world. Through acquisitions and internal development, Harris has become the ONE choice for integrated workflow solutions for the rapidly changing broadcast, distribution and entertainment industries.

Harris Broadcast Communications Business Units:

Harris Broadcast Communications consists of several business units focused on meeting the needs of radio and television broadcasters worldwide. These business units are tightly integrated to enable broadcasters to profit from new, multichannel services, get on air fast with high definition and effectively project their brand.

Television and Radio Transmission Systems is a leading developer and manufacturer of digital and analog television and radio transmission systems for delivery of rich media over wireless broadcast terrestrial networks on a worldwide basis, including global broadcast and mobile TV applications. We can provide single products or end-to-end systems, including nationwide networks with hundreds of transmitters or large international systems. We provided the nation's first advanced digital television ("DTV") transmitter as well as the first commercial DTV application and are a leader in technology for the U.S. digital standard ATSC and the European digital standard DVB-T. In 2007, we introduced a jointly-developed MPH™ in-band mobile DTV system (Mobile-Pedestrian-Handheld), a new technology capable of providing DTV signals and extending over-the-air broadcast TV signals beyond customary TV viewing at home to mobile, pedestrian and other handheld devices (such as mobile phones or laptop computers.)

We are also a leader in the transition from analog to digital radio. Product offerings address the U.S. digital standard IBOC (In-Band/On-Channel), as well as international digital standards, including DAB and DRM. In addition, PR&E audio and networking consoles solutions are part of the Radio Product portfolio. All of Harris transmission products are backed by unmatched service and training.

Software and Server Systems is a leading provider of software solutions for advertising, media management (traffic, billing and scheduling), broadband, digital asset management, and automation for workflow management. Software Systems offers modular, standards-based solutions with open APIs for maximum ease of integration and future scalability. The Software Systems business unit also includes servers, which enable broadcasters simple transitions into an IT workflow, managing content flow, storage and other key facets of an increasingly important file-based broadcast world.

Infrastructure and Networking Solutions was formed following the acquisitions of Leitch Technology and Aastra Digital Video - industry leaders in high-performance, multi-format solutions for professional digital video. This unit of Harris offers standard-definition/high-definition (SD/HD) products and systems that enable media companies to streamline workflow from production through transmission. A comprehensive, next-generation portfolio of processors, routers, master control and branding systems, network monitoring and control software, and test and measurement instruments supports content throughout the workflow application chain. Advanced multi-display processors and state-of-the-art broadcast graphics and digital signage systems change the way broadcasters view and manage content - and provide them options for presenting their brands. Networking solutions provide highly differentiated network access and multiplex platforms for integrated management and distribution of any content across any connection to support television government video and public safety applications.

**History: Growth through Innovation, Acquisitions and Product Line Expansion:**

- 1922: Less than two years after KDKA, one of the United States' first radio station, signed on the air in Pittsburgh, Henry and Cora Gates established Gates Radio in a rented apartment in Quincy, Illinois. The company's first product was a five-tube radio receiver developed by the Gates' 14-year-old son, Parker, retailing for \$275. Parker, a consummate inventor, developed many new products over the years, including such industry firsts as the condenser microphone and a remote amplifier that enabled events to originate away from a studio. In 1936, Gates Radio introduced its first transmitter to support the fledgling radio industry.
- 1957: Gates Radio becomes the first electronics firm acquired by Harris Intertype Corporation (now Harris Corporation).
- 1969: Harris enters the television market with its first line of VHF and UHF transmitters.
- 1988: Harris becomes the world's leading radio distributor with the acquisition of Allied Broadcast Equipment Corporation in Richmond, Indiana.
- 1991: Harris acquires TVT, a transmitter manufacturer in England, and the systems business of Midwest Communications Corporation based in Northern Kentucky.
- 1997: Harris acquires ITIS of Rennes, France. ITIS is the leading developer of COFDM technology used in European-standard DVB and DAB transmission systems.
- 1998: Harris acquires Intraplex®, a leader in the development of a full range of application-specific network access products.
- 1999: Harris acquires Pacific Research & Engineering® (PR&E®). In addition to an industry-leading console line, PR&E is a leader in broadcast furniture and radio studio systems.
- 2000: Harris acquires Louth Automation in Silicon Valley, California. The Louth name had become synonymous with television automation.
- 2001: Harris acquires the Hirschmann Multimedia Communications Network (MCN), Rankweil, Austria, a leader in European-standard DVB-T and DAB transmitters and digital cable systems.
- 2004: Harris acquires Question d'Image, a developer of digital content management solutions.
- 2004: Harris acquires Encoda Systems, a global leader in broadcast media software. The acquisition gives Harris the industry-standard traffic and billing system and highly synergistic automation and digital asset management solutions. (Encoda acquired Arkemedia, a digital asset management firm, in 2004 before Harris acquired Encoda.)
- 2005: Harris acquires Leitch Technology Corporation, becoming the global leader of Total Content Delivery for the digital media world. Leitch's product line includes high-performance video systems for the television industry including routers and distribution equipment; signal processing, signal management and monitoring, servers and storage area networks, branding software and post-production editing systems.
- 2006: Harris acquires Aastra Digital Video, developers of video networking, encoding, decoding, and multiplexing technologies used by television broadcasters, telecommunications providers and satellite networks. The heart of their product portfolio is the VideoRunner™ & NetVX™ multi-service video networking system.
- 2007: Harris acquires Zandar Technologies, a developer and provider of high-quality multi-image display processors for television broadcast and professional video markets. Zandar has pioneered the concept of multi-image video display technology to provide one integrated interface for multiple sources such as cameras, TV channels or video content.
- 2008: Harris acquires Desktopbox which offers a real-time internet broadcasting platform that enables synchronization between a radio or television broadcast and a web-based experience. The Desktopbox platform allows for a two-screen, enhanced multi media experience in which the system sends web links, ads and other content to browsers, synchronized with live programming.

World Firsts in Digital Radio Broadcast Technology and Products

Harris leads the broadcast radio industry in developing new technologies, establishing industry standard protocols and designing exceptional quality and value into every product. What's more, Harris is unmatched in applications experience, technical training and responsive worldwide service.

Harris has been a key driver of technology for Digital Radio transmission since the late-1980s. Through our world leading technology development, Harris introduces the world first digital radio transmitter in 1987, featuring Digital Amplitude Modulation technology used in DX Series medium wave broadcast transmitters.

Through the 1990's, Harris introduces DIGIT®, the world's first digital FM exciter, introduces AES3 input module, which allows DIGIT to directly accept digital studio-standard audio, introduces second-generation DIGIT@CD Digital FM Exciter and introduces the world's first uncompressed digital 950 MHz STL, CD Link™.

Harris supports all the global digital standards for radio, HD Radio (IBOC), DRM and DRM+ (Digital Radio Mondiale) and DAB (Digital Audio Broadcasting.)

As a longtime leader in radio transmission and a driving force in IBOC-HD Radio development and testing, Harris has fully committed all our resources from HD Radio ready transmitters to industry-leading digital on-air consoles to the transition from analog broadcasting to the new, FCC-approved digital broadcast standard. Harris has been working with HD Radio since the earliest days of development. We've provided linear AM and FM transmitters for every major HD Radio Test and demonstration for well over a decade. Indeed, with this track record, it is easy to see what more broadcasters selected Harris for their HD Radio transition than all the others combined and why the FlexStar™ is the broadcaster's choice for FM and HD Radio exciters.

Harris has been at the forefront of the DAB technology dating back to the Eureka 147 project, delivering its first DAB transmitter in Germany in 1992. Since then, Harris has provided transmitter for trials, and commercial network roll outs, including the worlds largest in the UK. Harris systems not only lead the market in the early days, but recently delivered record breaking size and efficiency performance improvements resulting in the world's most compact transmitter with the lowest total cost of ownership, the DMB 670.

Digital Radio Mondiale promises to provide the medium wave AM band a new lease on life with CD quality audio and extended services. All Harris digitally modulated transmitters since the very first DX in 1987 are DRM ready and can be converted simply and quickly. Harris has delivered more DRM ready transmitters than any other manufacturer and supported global trials and service launches, including several high power AM medium wave systems.

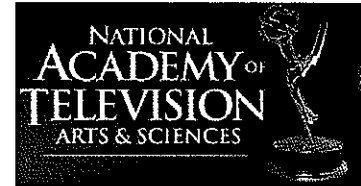


World-Leader in Digital Television Technology and Products

Harris is a leader for television's transition from analog to digital transmission, starting with its pioneering efforts with the North American ATSC standard. Harris has since developed and deployed solutions for multiple global digital television standards, including DVB-T/T2, ISDB-Tb, DMB-T, FLO, CMMB and CTTB. This position of leadership has also been made possible by the Apex M2X™ multimedia exciter, which features innovative real-time linear and non-linear digital correction to improve operating efficiency, increase power levels, and improve performance within the emission mask.

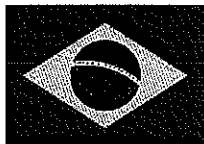
Innovative products from Harris cover the complete range of TV solutions required, from low power air-cooled to high power liquid-cooled. Harris continues our position of leadership through unsurpassed technical performance, compact footprints and lowest total cost of ownership to support even the most demanding return-on-investment requirements.

The Harris broadcast technical leadership is most noted by the recent award of a Technology & Engineering Emmy® Award from the National Academy of Television Arts and Sciences (NATAS) for developing special transmission filters that help broadcasters improve the quality and reduce the costs of operating digital television signals. The ATSC RF filter technology, which was awarded a U.S. patent in 2005, was pioneered by Harris, to overcome potential quality and interference problems stemming from operating adjacent analog and digital channel assignments



Harris has taken a leadership role in the ATSC since the beginning to help drive the transition to digital. Since its first commercial ATSC transmitter installations in 1996, Harris has led the world in this new technology area, delivering over 50 percent of the world's and 70 percent of the US's ATSC transmitters to leading customers across the globe. Harris has continued to innovate with new ATSC solutions, including the four generation ATSC exciter..

The Harris leadership position in the DVB-H space started first in the Hirschmann organization and continued after that became part of the Broadcast Division of Harris. Many of the first trials were supported by Harris transmitters, so it was only natural when it came time to roll out networks, Harris was chosen for some of the largest. Market firsts like adaptive echo cancellation for on channel gap fillers provided operators a way to fill in coverage on their networks simply and cost effectively. Harris continues this position of leadership by introducing breakthrough new products..



ISDB-Tb is the standard used in Brazil for both terrestrial digital and HD TV but also to provide mobile TV over the same infrastructure. While similar to the version used in Japan, ISDB-Tb has unique configurations. Harris is uniquely positioned as the only technology provider to offer complete end-to-end digital television solutions in Brazil including encoding, and HD content management systems. Harris has been a leader in the market, offering exclusive Real Time Adaptive Correction (RTAC™) technology tailored to meeting the specific requirements of ISDB-Tb and has also provided the world's highest power ISDB-Tb transmission system to ensure maximum coverage of the diverse terrain in Brazil.

Harris has long been held in high regard in China as a provider of superior broadcast technology. Harris has developed several solutions for DMB-T/H transmission to enable broadcasters to upgrade from analog or other digital standard to the new standard. The Harris solutions were recognized at the BIRTV exposition with a coveted award for innovation.



Global Service and Support

RFQ #EBA342
Digital Television Transmitter System

Service Program Overview

Harris provides unrivaled long-term customer support for users of Harris-branded hardware and Harris-developed software solutions, as well as Harris-distributed equipment.

One of the most compelling reasons for selecting broadcast equipment from Harris is the level of support you will receive. We call it sustaining support, because its purpose is to sustain your equipment to a level that provides the highest return on your investment. We also want to sustain your confidence in Harris as your preferred supplier.

Service Bulletins

Service bulletins are produced to make customers aware of performance improvement, field modifications requirements and other corrective measures when it is considered to be of significant importance to the operation and performance of the equipment. Harris sends the bulletins to the original purchaser or if known, to the current user of the product in question. All bulletins are kept on file in the event there is a request for all bulletins of a particular model.

Update Kits

In addition to the service bulletins mentioned above, Harris makes available update parts kits that may be purchased by customers wishing to keep their equipment up-to-date. In cases where the updates involve issues of safety or necessary corrections to meet specifications, the kits are provided at no cost to the end user.

Hardware and Equipment

Our customers can call Field Service during our regular business hours, 8-5 M-F. Customers who require off-air emergency support can call 24 hours a day, 7 days a week and be connected with an on-call engineer. In the US and Canada: 1-888-534-8246.

Harris Parts department located at the transmitter manufacturing facility in Quincy Illinois. Harris supports all manufactured product for a minimum of 10 years. Harris ships 90 percent of all emergency parts within 24 hours and 99 percent within five days. It is Harris's intention to maintain product parts availability at all times.

Harris is also the only manufacturer to sponsor a training center with a full complement of general training classes as well as Harris product courses. Customized training is also available. You will find more information on the training department at the training page.

In addition to the services offered above, we offer unparalleled support documentation for the experienced engineer. Support documents provided include:

- Product Manuals
- Complete Part Listings
- Schematics
- Procedures

These and many more documents can be found in the Downloads section of our Harris Self-Service Support Site.

Timely Delivery

Need something repaired? Notify the service support center for your product and region and call us for a RMA so we know it is coming.

Harris-manufactured items small enough to ship go to our factory repair center, where they can be repaired quickly and economically.

The Harris in-house technical repair facility provides our customers with the best repair, refurbishment, and upgrade opportunities available. Staffed by technically expert and product knowledgeable engineers and

technicians, we perform services ranging from simple troubleshooting and component replacement to complete overhauls and refurbishments of all types of equipment. Our process includes testing your equipment using original factory test procedures. No repaired equipment will be returned until it performs to "as new" functionality or we will contact you to explain the problem and work out an alternative course of action.

Need short term replacement modules? Our services also include a rental program, which enables you to stay on the air while your equipment is being repaired. We have over 60 modules available for rent to support the vast majority of Harris-built equipment in service. For a complete list of rental equipment please contact the repair call center at 1-888-534-8246.

Onsite Support

When it's critical to have an added level of onsite support, Harris has an experienced team ready to assist you:

- Diagnose, troubleshoot, calibrate and check network interoperability
- Maintain, proof or evaluate current and existing systems
- Customize onsite support packages specifically to your needs.

Specialized Services

Onsite Field Checkout Commissioning Services: One of our trained engineers will review and verify that your installation meets manufacturer specifications. They will ensure product integration and interfaces for interoperability and make sure your new or existing project gets online quickly.

Radio and Television Transmission Services: Harris Corporation's highly trained, highly experienced staff has installed, commissioned and maintained hundreds of radio and television transmitters worldwide. Transmission onsite field engineers from Harris provide these ongoing transmission services:

- Turnkey installations
- Installation assistance and commissioning
- Preventive and after-warranty maintenance
- Troubleshooting and equipment repair

Support Prestaging

Factory prestaging is available on large system installs and makes sure everything is working as a complete system before it gets shipped to a remote location. It also reduces onsite setup time. Customers may preview their systems in person by visiting the factory for a Factory Acceptance Test.

Project Management

Make your next project a huge success with Harris' project management services. We can:

- Perform an onsite survey of all broadcast-related products
- Review your system for interoperability issues
- Perform a cost-saving study
- Create a customer service support plan:
 - Workflow requirements
 - Design and training
- Identify project needs:
 - Maintenance projections
 - Outsourcing resources
- Align strategic plan
- Coordinate project to ensure performance
- Collaborate and define ongoing needs for system lifecycle.

Let us help you with the project management of your next system. Contact us or call your Regional Sales Manager for a quote.