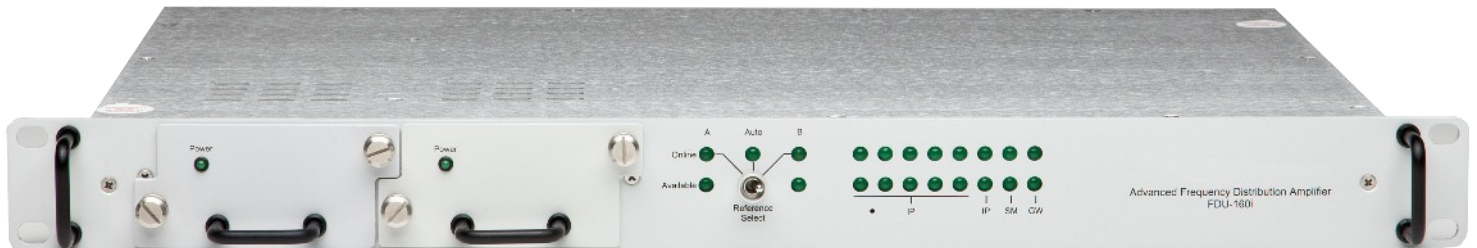


# FDU-160i - ADVANCED FREQUENCY DISTRIBUTION



**16 Output Low Phase Noise, Network Enabled  
Programmable Frequency Distribution Unit  
with Dual Redundancy**



AS9100D Certificate Number : C0210021-AS3



# FDU-160i - ADVANCED FREQUENCY DISTRIBUTION

## Product Overview



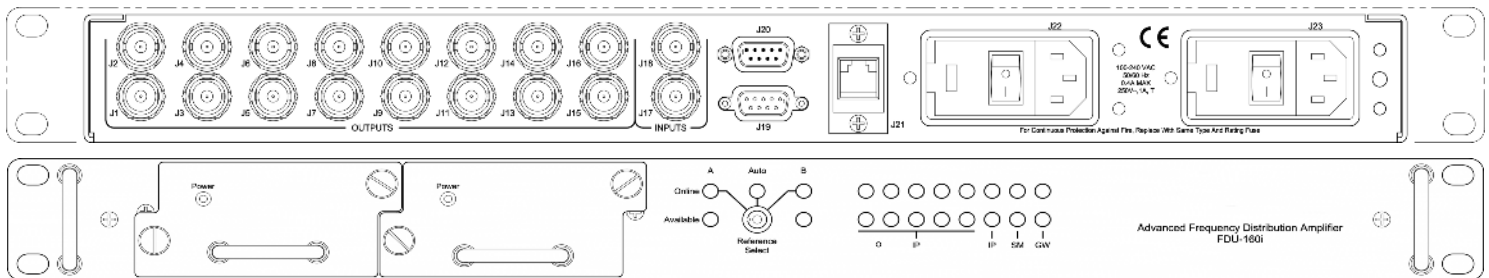
The FDU-160i Frequency Distribution Unit is a high quality, programmable frequency distribution platform offered with dual redundant hot swap PSUs and a number of frequency based functional variants. Applications for the FDU-160i include secure communications systems, satellite ground stations, digital television broadcasting and any application requiring highly reliable frequency outputs and/or where networking capability and programming is a requirement.

The FDU-160i base unit model has sixteen short circuit proof, low phase noise sine wave outputs (typically 10MHz) grouped as 2 banks of 8, available at the rear panel via BNC connectors, driven in response to one of two independent and isolated (Ref A & Ref B) signal source reference inputs. Each reference input is capable of driving all 16 outputs.

Each output has a network programmable amplitude and reference signal assignment along with fully independent status checking and fault condition reporting via the SNMPv2c trap based network interface and rear panel D type connectors. Once selected, reference signal sources are automatically switched over should a reference fail with the facility to pre-program the system response and reversionary timings once the normally assigned reference is restored. A three-position front panel switch facilitates the manual override selection of either reference A or reference B. With automatic mode selected, each output will be driven by the programmatically assigned reference.

Front panel indicators show the status of the input selection and output condition along with power status indication. Each of the sixteen outputs is continually monitored and should an output fail for any reason, then a group alarm fault indicator will illuminate and trigger a rear panel fault alarm signal that may be used by external equipment to modify the reference and output signal routing and selection.

The unit has a built in user friendly web based SNTP server interface available via an RJ45 10/100BaseT rear panel network port facilitating unit setup and subsequent system monitoring.



## Key Feature Summary

Options & Features
<ul style="list-style-type: none"> <li>• Network Enabled Frequency Distribution Amplifier</li> <li>• Dual Frequency Inputs with Auto Failover</li> <li>• Low Phase Noise Reference Frequency Outputs</li> <li>• Programmable per channel amplitude</li> <li>• SNMP v2c, HTTP, DHCP, IPv4 Protocols : RFC 1901, RFC 1905, RFC 1906, RFC 2578</li> <li>• 1U 19" rack mount</li> <li>• Dual Redundant Hot Swap Power Supplies</li> </ul>
Signals
<ul style="list-style-type: none"> <li>• 16 discrete, fault tolerant and fully monitored sine wave outputs on BNC connectors</li> <li>• Two reference signal inputs with automatic switching</li> <li>• Fault status indication and fault driven reference changeover</li> </ul>

# FDU-160i - ADVANCED FREQUENCY DISTRIBUTION

## Specifications ( Note : For wideband, 1 - 20 MHz operation, please refer to our FDA-160i)

Specifications - FDU-160i	
<b>Reference Frequency Inputs</b>	<b>Details</b>
Connectors	2 x Rear panel BNC
Amplitude	0.5 V to 1.0V RMS - Nominally factory set at 1V RMS - Transformer coupled
Input Impedance	50 Ohms
Frequency	10 MHz +/- 5ppm
<b>Fault Discrete Input</b>	
Number of inputs	2
Connector	9 Way D Type Socket
Level	TTL
Active Level	Link selectable, high or low to force reference changeover
<b>Sine Wave Outputs</b>	
Number of outputs	16 - 2 x 8 @ 10MHz or 1 x 8 @ 5MHz + 1 x 8 @ 10MHz - other combinations available
Connectors	BNC
Frequency (MHz)	Same as input, nominally either 1, 5, 10 or 20MHz - 10MHz factory default
Level	+5dBm to +13 dBm into 50 ohms - programmable per output
Stability with external reference	Same as input
Stability with clean-up oscillator	Temperature: $\pm 3 \times 10^{-9}$ from 0 - 60°C / Aging: $5 \times 10^{-7}$ per year
<b>Noise pickup</b>	
Distortion	-40dBc
Cross Talk	-80dBc
Spurious	-80dBc
<b>Additive Phase Noise @10MHz</b>	<b>dBc/Hz</b>
1 Hz	-132
10 Hz	-142
100 Hz	-155
1000 Hz	-163
> 1000 Hz	-163
<b>Environmental</b>	
Temperature	Instrument : -10°C + 50°C / Antenna -40°C to + 85°C
Humidity	95 % non condensing
Power	85VAC - 265VAC 50/60Hz or DC with hot swap dual redundancy < 15W
Power Options	18-36 VDC, 36-72 VDC, - 48VDC
<b>Network Interface</b>	
Interface	RJ45 - 10/100BaseT
Protocols	HTTP, SNMPV3, DHCP, IPV4
<b>Console Port</b>	
Interface	9 Way D type socket 115K Baud - 115200, N, 8, 1
<b>Display</b>	
Type and Function	16 Bi-Colour LEDs - Output Status and Ethernet Settings
<b>Alarms</b>	
Electrical	Dry relay form C contacts - Function Summary of all input/output alarms (relay)
Ethernet Network	SNMP trap - SNVPv3
<b>Physical</b>	19" Rack 1U 1.75" (H) x 7.5" (D) x 17" (W) [ 4.4 cm(H) x 19 cm (D) x 43.2 cm (W) ] Weight : 3.5 lb (1.6 Kg)
<b>Compliance</b>	CE Approved - EMC Emissions to EN55022 as EN55024 - FCC Part 15B, Class A EMC Immunity to EN50082-1 as EN61000-4-2 ESD, IEC801-3 HF Field & IEC 801-4

### Common product configurations :

INPUTS : 2 x 1MHz, 5MHz or 10MHz with OUTPUTS : 16 x 1Mhz, 5MHz or 10MHz Output  
 INPUTS : 1 x 5MHz & 1 x 10MHz with OUTPUTS : 8 x 5MHz + 8 x 10MHz Output

# Satisfied customers include..

ABB Singapore Airbus Defence & Space ASM Technologies Ltd Atkins Babcock International BAE Systems BBC BP CMC Engineering Malaysia	EDF Energy Indian Navy Jakarta Metro Leonardo Electronics Defence And Security London Stock Exchange London Underground MBDA Ltd MTRC Hong Kong National Air Traffic Services	NASA NEC Network Rail Northrop Grumman Park Air Systems Ltd Qinetiq Ltd Raytheon Systems Ltd Rockwell Automation SBS Transit Singapore Siemens Transportation	Singapore Stock Exchange Telent Technology Services Limited Teligent Thales UK Transport For London Viacom
--	---	---	---

## Sales Contacts and Global Representatives

### TFS UK Head Office

Mrs Laura Cain  
 Sales Coordinator  
 TFS, Witham, CM8 3AL, UK  
 Tel : +44 (0) 1376 514114  
 laura.cain@timefreq.com

### Europe, Middle East, Africa, Australia

Mr David Wright  
 Director of Sales, Europe, Middle East,  
 Africa, Australia  
 Tel : +44 (0) 1694 722891  
 dwright@timefreq.com

### Asia, China, India, Japan

Mr Neil Pitman  
 Director of Sales - Asia  
 China, India, Japan  
 Mobile : +44 (0) 7973 859342  
 neil.pitman@timefreq.com

<b>Austria, Germany &amp; Switzerland</b> <b>Semic RF Electronic GmbH</b> <i>Contact : Wolfgang Gruber</i> Tel: +0049 89 614 1520 Email: sales@semic.de Web : www.semic.de	<b>Israel</b> <b>IES Electronics Agencies (1986) Ltd</b> <i>Contact : Avi Nataf</i> Tel: +00972 37530700 Email: info@nisko-ies.com Web : www.nisko-ies.com	<b>Philippines</b> <b>Imaginet International Inc</b> <i>Contact : Mr Blair Duncan</i> Tel: +63 2 895 9755 / Fax : +63 2 895 9766 Email: blair@imagnet.com.ph Web : www.imagnet.com.ph
<b>Australia &amp; New Zealand</b> <b>Unitronix</b> <i>Contact : Tim Marshall</i> Tel: +0061 02 4977 3511 Email: sales@unitronix.com.au Web : www.unitronix.com.au	<b>Italy</b> <b>Millimettrica RF &amp; Microwave Components SRL</b> <i>Contact : Aldo Cagno</i> Tel: +0039 011 317 9910 Email: acagno@millimettrica.it Web : www.millimettrica.it	<b>Singapore</b> <b>PROGRESO Networks (S) Pte Ltd</b> <i>Contact : Victor Tang</i> Tel: +65 6509 9600 / Mobile +65 9735 1700 Email: victor@progreso.com.sg Web: www.progreso.com.sg
<b>Brazil</b> <b>Sigtron Instrumentos e Servicos Ltda</b> <i>Contact : Eduardo Strafacci</i> Tel: +0055 11 5031 7359 Email: eduardo@sigtron.com.br Web : http://sigtron.com.br/	<b>Japan</b> <b>Nacelle Co Ltd</b> <i>Contact : Mr Hisato Tadokoro</i> Tel : +81 3 5921 5099 Email : tadokoro@nacelle.co.jp Web : www.nacelle.co.jp	<b>Thailand</b> <b>CSG Solution (Thailand) Company Ltd</b> <i>Contact : Mr Chinnaret Kusathisiriphan</i> Tel: +66 2 575 2971 / Mobile +66 94 951 6524 Email: chinnaretk@csgs.co.th Web: www.csgs.co.th
<b>China, Hong Kong &amp; Macau</b> <b>Spectrum &amp; Master Comms. Technologies</b> <i>Contact : Mr William Lai</i> Tel: +852 2529 1111 / Mobile +852 9378 9271 Email: smcthk@netvigator.com	<b>Korea</b> <b>ETOOB</b> <i>Contact : Jaydon Lee</i> Tel : +82-2-6677-3409 Email : jaydon.lee@etooob.co.kr Web : www.etooob.co.kr	<b>Turkey</b> <b>Merit Elektronik</b> <i>Contact : Levent Celebi</i> Tel: +0090 312 472 7495 Email: leventc@meritelektronik.com.tr Web : www.meritelektronik.com.tr
<b>Indochina (Vietnam, Laos, Cambodia)</b> <b>Hanova JSC</b> <i>Contact : Mr Hai Le</i> Tel: +84 91 351 4905 Email: hai.le@hanova.vn Web : www.hanova.vn	<b>Malaysia</b> <b>Alam Sinergi Teknik Sdn. Bhd.</b> <i>Contact : Mr HH Chew</i> Tel: +60 3 7847 5925 / Mobile: +60 13 5131068 Email: hhchew@alamsinergitekNIK.com	<b>South Africa</b> <b>Satellite 2000 Systems International Inc</b> <i>Contact : Fred Joubert</i> Tel: +001 818 991 9794 Email: sales@sat-2k.com Web : www.sat-2k.com
<b>India</b> <b>PDAC Microsystems Pvt Ltd</b> <i>Contact : Mr Pradeep Dhar</i> Tel: +91 40 40247626 / Mobile +91 80082 95670 Email: pradeep@pdac.in Web : www.pdac.in	<b>North America : USA &amp; CANADA</b> <b>Brandywine Communications Inc.</b> Tel: +1 877 367 7962 Fax: +1 714 755 0175 Email: info@brandywinecomm.com Web : www.brandywinecomm.com	<b>U.A.E.</b> <b>Zener Fire &amp; Security LLC</b> <i>Contact : Ranjith Nambiar</i> Tel: +0021321548618 Email: ranjith@zenerfire.com Web : www.zenerfire.com
<b>Janus Trading Co</b> <i>Contact : Mr Santosh Krishnan</i> Tel: +91 124 408 6641 Email: santosh@januscorp.in Web : www.januscorp.in	<b>North Africa, Mauritania, Morocco, Tunisia, Algeria, Libya, Egypt, Chad, Mali</b> <b>ProComSat</b> <i>Contact : Hussein Ait Si Selmi</i> Tel: +0021321548618 Email: hussein@procomsat.com Web : www.procomsat.com	
<b>Signowave Solutions Private Limited</b> <i>Contact : Santosh Kulkarni</i> Tel : +91 40 6717 2356 / Mobile : +91 70327 09060 Email: santosh.kulkarni@signowave.com Web : www.signowave.com	<b>Spain &amp; Portugal</b> <b>Tecnologia GPS S.A.</b> <i>Contact : Jose Luis Estaban</i> Tel: +34 91 323 72 30 Email: comercial@tecnogps.es Web : www.tecnogps.es	

**tfs Time & Frequency Solutions**

25 Eastways, Witham, Essex, CM8 3AL, UK  
 Phone +44 (0) 1376 514114 | Fax +44 (0) 1376 516116  
 Email : enquiries@timefreq.com

**brandywine communications**

153 Warner Ave, Tustin, CA 92780, USA  
 Phone +1 714 755 1050  
 Email : Info@brandywinecomm.com

Disclaimer : Brandywine & TFS are always seeking to improve our products, the information in this document only provides general indications of product capability, suitability and performance, none of which shall form any part of any contract.