Syrinx-Demux

User Manual

Software Version 2.0x

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Chapter 1 Introduction

1.1 Overview of Syrinx-Demux System

The Syrinx-Demux Digital Demultiplexer System is a DSP (Digital Signal Processing) based FM demultiplexer system designed around the Syrinx-DualVME Dual Digital FM Demodulator card. The system can be configured to support from 2 to 22 FM discriminator channels in a single 7U chassis. A 1U rack mount drawer unit provides keyboard, mouse, and LCD display capability for setup and operation. The VME based system is controlled by a Master CPU running Windows 2000 or WindowsXP Operating System. An optional HalluxVME-01 16 channel calibration card can be added to the system for a complete telemetry FM solutuion. Windows based Graphical User Interface (GUI) software is provided to easily configure and operate the system. The Syrinx-Demux can also be controlled through an Ethernet interface to either a laptop or a networked workstation. The Built In Test (BIT) feature allows the user to verify system setup and functionality prior to a test.

The Syrinx-Demux Digital Demultiplexer System supports FM/FM, FM/PCM, and FSK modulation techniques. Fully programmable, all IRIG 106-93 CBW and PBW FM subcarriers are supported as well as non-standard frequencies with a carrier frequency range of 250 Hz to 3.5 MHz and a digital output filter frequency range of 1 Hz to 1 MHz.

The input subcarrier is received in analog form, conditioned with a digital auto gain control circuit, and fed into a sophisticated anti-alias filter prior to a 12-bit digitizer. The demodulated output data is available in analog format through BNC connectors or in digital format via a PCM stream generated by the Syrinx-DualVME card's PCM Frame Generator utilizing the P2 bus. The analog data is reconstructed using a programmable reconstruction filter, then normalized to user specified output levels and offsets.

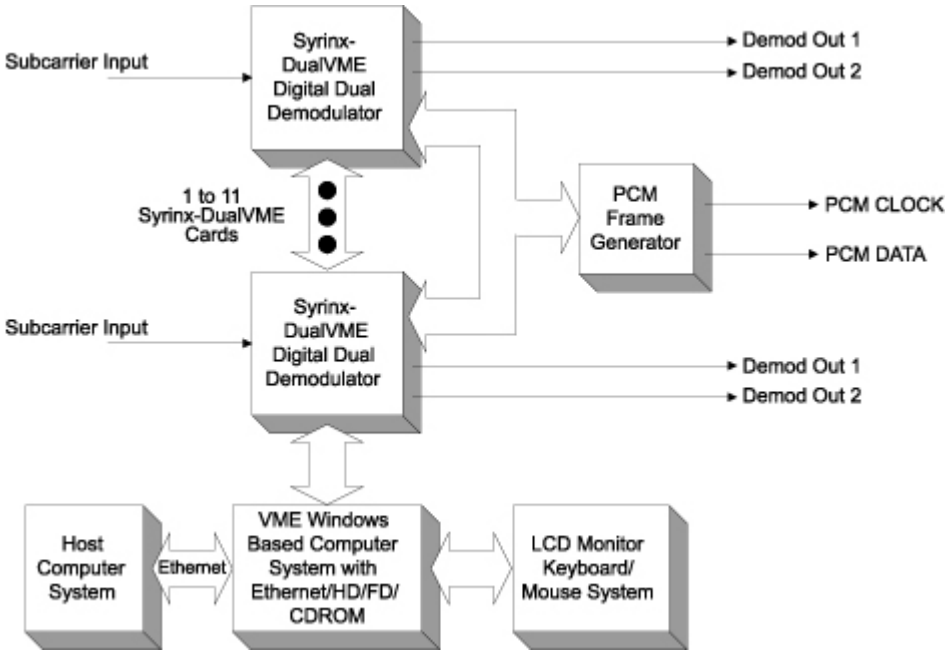


Figure 1 - Syrinx-Demux Block Diagram

Syrinx-Demux System Specifications

Input Specifications

Subcarrier Frequency	250 Hz to 3.5 MHz, programmable
Input Amplitude Range	15 mVpp to 4.0 Vpp
Maximum Safe Input	± 35 VDC
FM Deviation Range	0.5% to 50.0% of entered center frequency, programmable
Demodulation Mode	FM, FSK, selectable
Impedance Matching	50, 75, or 10k Ω shunted by 10 pF, selectable
Channels per System	6 to 22 Channels

Output Specifications

Demod Analog Output	1 to 10.0 Vpp into 1k ohm load, programmable
Demod Output Offset	Programmable offset from –5 VDC to +5 VDC
PCM Generator Bit Rate	15.0 Mbps maximum
PCM Generator Modes	NRZ-L, RNRZ-L, selectable
Max Demod Data Rate	1 MHz analog data, 2.7 Mbps NRZL data
Time Correlation	All demod channels with identical deviation and output filter settings will be time correlated within 12.5 nanoseconds.

Input Power

Input Power Requirement	Switch Selectable 85-132 VAC or 165-265 VAC, 47-63 Hz, 400 Watts Max

Physical Specifications

Physical Dimensions	
7U VME Chassis	12.25” H X 19” W X 12” D, rack mountable
1U Display/Keyboard	1.75” H X 19” W X 20”D, rack mountable
Interface Connectors	All connections to the system are through BNC connectors on the front panel of the chassis.
Temperature Range	Operating: 0°C to 50°C Storage: -20°C to 60°C

Ordering Information

Syrinx-Demux-xx	Digital Demultiplexer System Including 1U Display and Keyboard Unit

Note: Complete system part number by entering the number of channels in place of xx. Channel count per system must be a multiple of 2 from 2 to 22.

1.2 Overview of Syrinx-DualVME Demodulator

The Syrinx-DualVME Digital FM Demodulator card is a DSP (Digital Signal Processing) based two-channel FM demodulator packaged in a VME 6U form factor. Built In Test (BIT) feature, with the accuracy of an external calibrator, allows the user to verify demod setup and functionality. DSP algorithms are implemented in state-of-the-art FPGAs (Field Programmable Gate Arrays) allowing for rapid enhancements or customization.

With two fully programmable demodulator channels per card, each capable of demodulating FM/FM, FM/PCM, and FSK, the Syrinx-DualVME is the most flexible VME based FM demodulator available. All IRIG 106-93 CBW and PBW FM subcarriers are supported as well as non-standard frequencies with a carrier frequency range of 250 Hz to 3.5 MHz and a digital output filter frequency range of 1 Hz to 1 MHz. Additional recommended applications of the Syrinx-DualVME card include tone detection and pre-detection of antenna AGC signals. The PCM Frame Generator feature allows the user to encode demodulated data from multiple cards into a single NRZ-L or RNRZ-L PCM data stream for digital storage or transmission.

By using DSP based algorithms, including Finite Impulse Response (FIR) filters, multi-stage recursive decimation filters, Modulated Numerically Controlled Oscillators (MNCO) and DSP implemented Phase-Locked Loops (PLL); the Syrinx-DualVME eliminates the need for calibration and tuning. C++ language source code is supplied which aids in creating integrated instrument software for complex VME applications.

The input subcarrier is received in analog form, conditioned with a digital auto gain control circuit, and fed into a sophisticated anti-alias filter prior to a 12-bit digitizer (see block diagram below). The demodulated output is available in both analog and digital formats. The analog data is reconstructed using a programmable reconstruction filter, then normalized to user specified output levels and offsets. The digital data is available through a PCM stream generated by the on-board PCM Frame Generator.

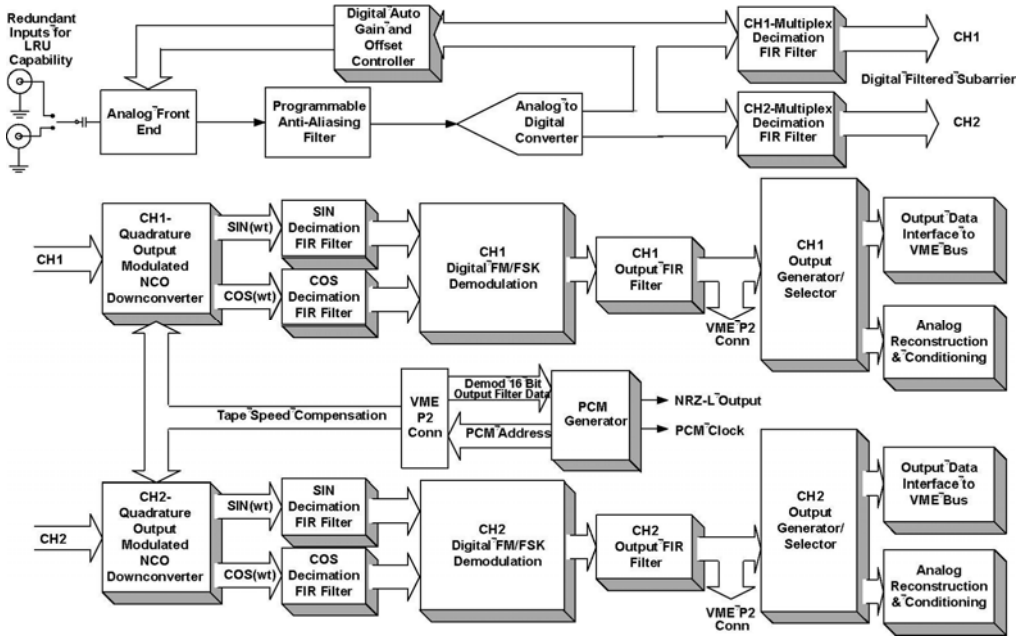


Figure 2 - Syrinx-DualVME Block Diagram

1.3 Syrinx-DualVME Demodulator Specifications

Input Specifications

Input Subcarrier Frequency Range	250 Hz to 3.5 MHz, programmable
Input Subcarrier Amplitude Range	15 mVpp to 4.0 Vpp
Maximum Safe Input	± 35 VDC
FM Subcarrier Deviation Range	0.5% to 50.0% of entered center frequency
Demodulation Mode	FM, FSK
Input Impedance Matching	50, 75, or 10KΩ shunted by 10 pF, selectable

Demodulator Specifications

Output Filter Frequency Modes	There are 3 digital output filter frequency modes: ***Analog Mode (Linear Data):*** The FIR filter is programmed to be flat within 0.1 dB in the programmed passband and -60 dB attenuation at 2 times the programmed cutoff frequency. ***Digital Mode (PCM Data):*** The FIR filter is programmed to be monotonic in the passband with -3 dB attenuation at the programmed cutoff frequency and down -50 dB at 2.5 to 3.0 times the programmed cutoff frequency. ***Bypass Mode (>1MHz Data):*** The digital and analog reconstruction filters are bypassed for maximum digital data throughput, up to 2.7 Mbps NRZL. The data frequency throughput is equal to the programmed deviation filter frequency.
Output Filter Frequency Range	Programmable from 1 Hz to 1 MHz with FM deviation ratios from 1 to 64 of the programmed deviation or from 1.5% to 50% of the subcarrier frequency
Output Linearity	Less than 0.05% of programmed full deviation bandwidth measured from the best 3-point straight line
Output Harmonic Distortion	All harmonic terms are below -56 dB for FM deviation ratios of 2 and -60 dB for FM deviation ratios >5
Output Impedance	1 k Ohm
Analog Output Level	Programmable from 1.0 Vpp to 10.0 Vpp with programmable offset from –5 VDC to +5 VDC
Analog Output Noise	Less than 10 mVRMS
Subcarrier Deviation Accuracy	0.0244% of the programmed center frequency (32 bit MNCO phase accumulator)
Linear Deviation Range	±125% of the programmed deviation

PCM Generator Specifications

PCM Output Format	NRZ-L or Randomized RNRZ-L PCM data and clock with 0° or 180° bit clock, program selectable
Word Size	16 bits per word, 32 bit sync pattern
Max Frame Size	2048 words

Output Bit Rate	Sub-multiples of 60MHz clock, 15 Mbps max
Data Sample Rate	2.5 to 5 samples per period based on the programmed output filter frequency
Operation	The PCM Generator allows the user to build a PCM frame containing data from selected digital demodulator outputs available on the P2 connector. The bit rate of the PCM output is determined by the sample rates of each data channel. The sample rate for each channel is determined by the programmed output filter frequency.

Physical Specifications

VME Form Factor	32 bit VME 6U form factor
Interface Connectors	Subcarrier input, both demodulator analog outputs, and PCM clock and data output signals are available on BNC connectors.
Manufacturing	The design utilizes Surface Mount Technology (SMT), manufactured with robotic assembly techniques to IPC-610B Class 2 manufacturing standards
Temperature Range	Operating: 0°C to 50°C Storage: -20°C to 60°C
Power Consumption:	Less than 35 Watts total, for all supplies

Ordering Information

Syrinx-DualVME-01	Dual Digital FM Demodulator

1.4 Optional HalluxVME Calibrator Specifications

Overall Card Specifications

Calibrators per card	Sixteen (16)
Summing Input Level	5.0 VPP for max resolution for a single sub-carrier (Summing Input sums external Analog input for higher channel multiplex capacities)
Multiplex Output Level	Programmable from 1.0 to 10.0 VPP into a 1kOhm load
Frequency Range	250 Hz to 5 MHz
Analog Output Noise	Less than 10mVRMS

Calibrator Specifications

Calibration Modes	Manual or Automatic (Auto-step)
Calibration Steps	3 to 21 steps from -100% to +100% deviation
Auto-step Dwell Time	0.5 to 10 seconds per step Programmable in 0.1-second increments

Individual Calibrator Specifications

Subcarrier Frequency Range	250 Hz to 5.0 MHz
Center Frequency Resolution	0.0002 PPM (1 part in 232)
FM Deviation Range	0.5% to 50.0% of center frequency
Subcarrier Harmonic Distortion	All harmonic terms are below -56 dB

Pre-emphasis Scheduling	Programmable from 0 to -20 dB per subcarrier
Deviation Accuracy	0.0244% of the programmed center frequency
Linear Deviation Range	±125% of the programmed deviation
Frequency Stability	25 PPM over the full operation range

Physical Specifications

VME Form Factor	32 bit VME 6U form factor
Interface Connectors	Calibration analog output on BNC connector.
Manufacturing	The design utilizes Surface Mount Technology (SMT), manufactured with robotic assembly techniques to IPC-610B Class 2 manufacturing standards
Temperature Range	Operating: 0°C to 50°C Storage: -20°C to 60°C
Power Consumption:	Less than 35 Watts total, for all supplies

Ordering Information

Hallux-VME-01	16 channel FM Calibrator

1.5 Warranty

Ulyssix Technologies, Inc. warrants its products to be free from defects in material and workmanship, under normal use and service, for one year from the date of shipment to the original purchaser. The equipment must be returned transportation prepaid to the factory, and if found to be defective, at the Company's option, will be repaired or replaced free of charge and returned transportation prepaid. If inspection by Ulyssix does not disclose any defect in material or workmanship, Ulyssix standard repair service charge will apply. This warranty does not extend to any products that have been subject to misuse, negligence, modifications or abnormal operating conditions or cover expendable items such as lamps, batteries, fuses, etc. Customer furnished equipment and hardware purchased for resale included in systems are covered by the original manufacturers warranty. Ulyssix makes no express or implied warranties beyond those described herein, and in no event will Ulyssix be responsible for consequential damages of any nature arising out of or connected with the use of its products.

1.6 Repair Service Charges

The minimum service charge for non-warranty repair of individual units, accomplished at our factory is $250 per unit plus return shipping charges. Equipment must be shipped to the factory with transportation prepaid. Please call the Ulyssix Customer Service Department at 301-846-4800 for a return authorization number and shipping information. All units repaired will be warranted for 90 days from the date of the said repair.

Chapter 2 Hardware

2.1 Product Identification - System

Each Syrinx-Demux System is assigned a unique serial number before shipment from the factory. This number, as well as the unit's model and revision are clearly marked on the serial number tag on the back of the unit. Reference the serial number and model number when contacting the factory for support.

2.2 Product Identification – Syrinx-DualVME Cards

The Syrinx-Demux System consists of a 7U VME chassis, CPU card, and multiple Syrinx-DualVME cards. Each Syrinx-DualVME card is assigned a unique serial number before being installed into a Syrinx-Demux System. This number, as well as the unit's model and revision are clearly marked on the reverse side of the PC board.

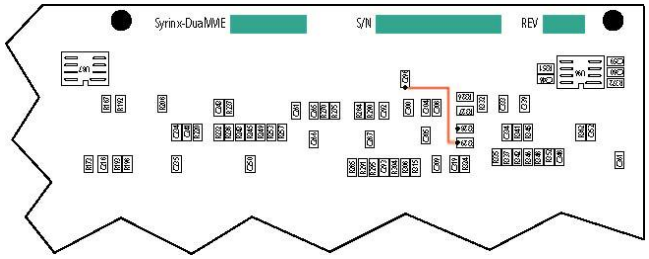


Figure 3 - Product Identification – Syrinx-DualVME

2.2.1 Model Number

The model number of the Syrinx-DualVME card indicates which options are installed on that specific unit. Model number definitions are provided in the table below.

Model	Description
Syrinx-DualVME-01	Standard Dual Digital Baseband FM Demodulator

2.2.2 Serial Number

A unique serial number is assigned to each Syrinx-DualVME board. Reference this number to identify the specific unit during any communications with the factory.

2.2.3 Revision Number

The REV number indicates the assembly revision level of the unit.

2.3 Electrostatic Discharge (ESD) Precautions

The Syrinx-Demux System is a sophisticated electronic device. Damage can occur if the product is not handled and used properly. Care should be taken not to expose the unit to physical abuse, moisture, Electrostatic Discharge (ESD), or other potentially harmful conditions. Carefully unpack the system in an ESD safe location and check the product for physical damage from shipment. If there is any question about the condition of your system upon receipt, contact the factory.

2.4 Connections

All connections to the Syrinx-Demux System are made through the front panel. The keyboard, display, mouse, and network connections as well as the input and output connections for each Syrinx-DualVME card are identified in the diagrams below.

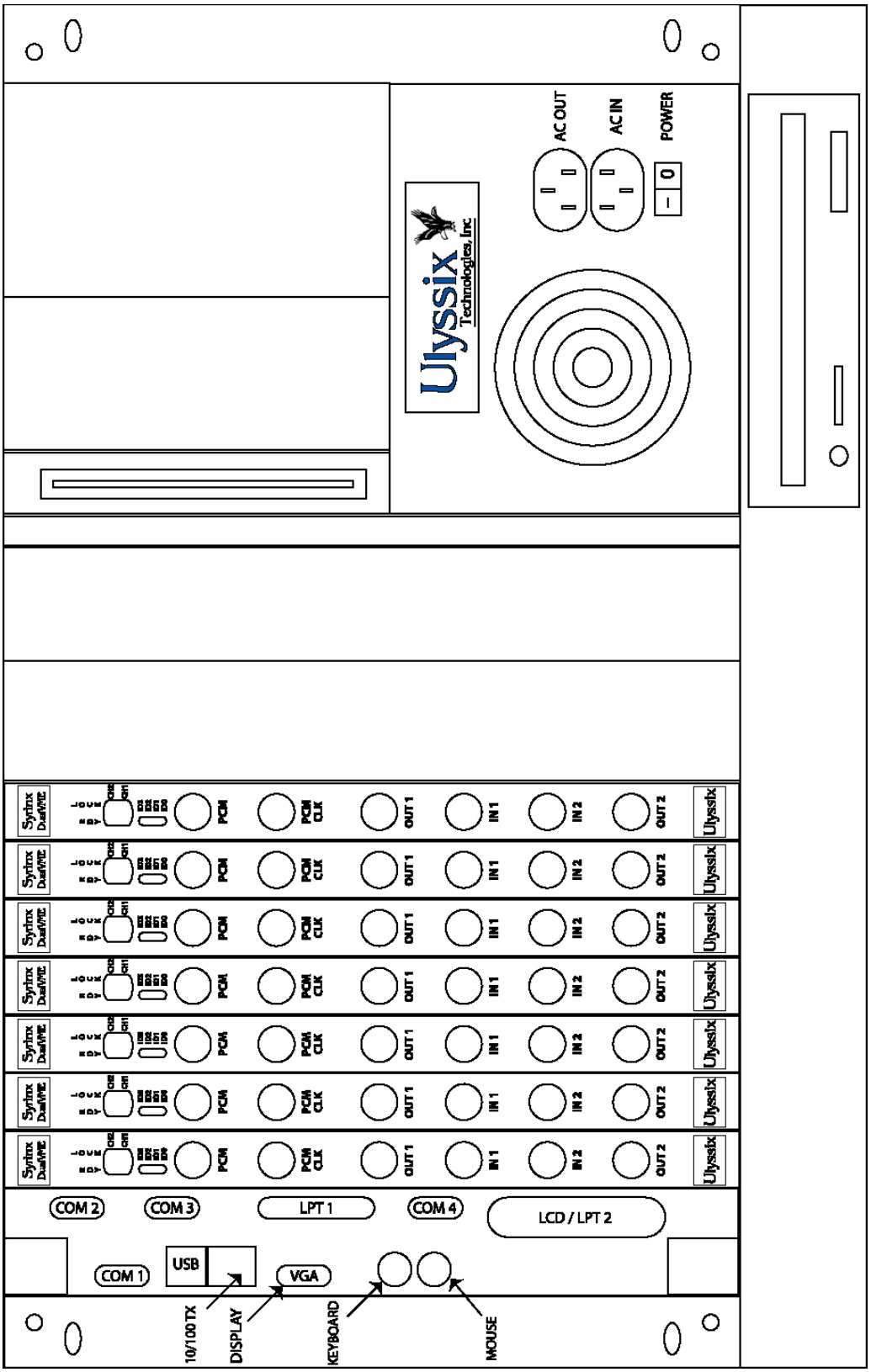


Figure 4 - Syrinx-Demux Front Panel

2.4.1 CPU Interface Connections

The Syrinx-Demux is a VME based system that is controlled by a master CPU running Windows 2000 or WindowsXP Operating System. Interface to the unit is very similar to that of a standard personal computer. The typical configuration of the system includes a 1U rack mountable LCD display with keyboard. Other keyboard, display, and mouse peripherals may be compatible with the system. Connect the Keyboard, Mouse, and Display to the appropriately marked connectors of the CPU card.

2.4.2 Remote Control Connections

The Syrinx-Demux can be remotely controlled by loading and running a "remote control" software package such as Symantec's pcAnywhere. This approach allows you to control the unit either through a Local Area Network (LAN) or through direct connection between a "Remote" computer and the "Host" Syrinx-Demux System. Contact the factory for assistance.

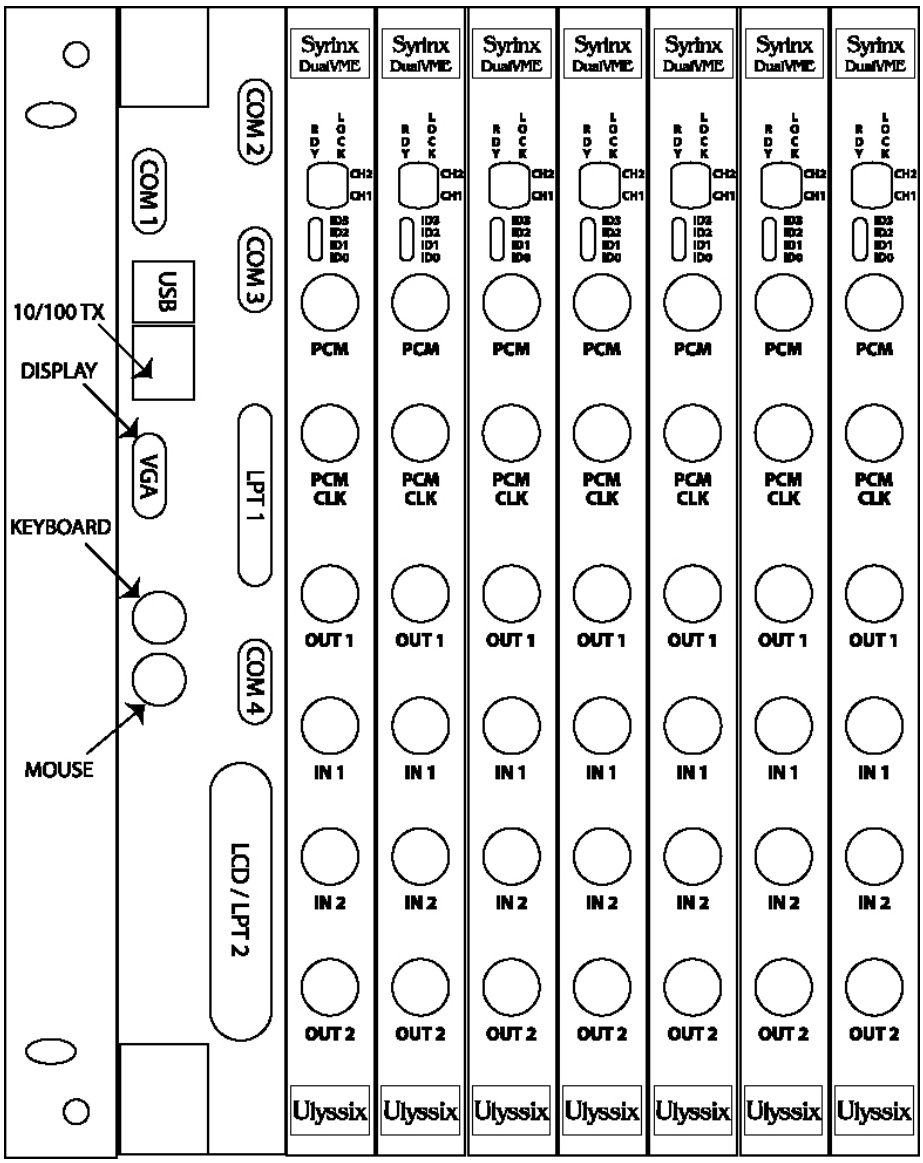


Figure 5 - Syrinx-Demux Connections

2.4.3 Syrinx-DualVME Card Connections

Input and output connections are made to the Syrinx-DualVME through BNC connectors on the front panel.

2.4.3.1 Subcarrier Input (IN1)

Connect the signal(s) to be demodulated to the Subcarrier Input Connector labeled IN1. Each Syrinx-DualVME card has an independent input connector. The signal to be demodulated can be patched to as many cards as necessary. This allows you the flexibility to connect as many input multiplexes as you have cards.

NOTE: Input Specifications for Syrinx-DualVME card are listed in the Specifications Section of this manual. The input impedance for the input to the board is jumper selectable for 50, 75 or 10K Ohms. Refer to the following sections for details on how to select the input impedance.

2.4.3.2 Line Replacement Unit Input (IN2)

The Syrinx-DualVME card provides the user with the ability to select one of two connected inputs. This is typically used to connect a calibration signal to the demodulator to verify system integrity prior to a test. Connect the LRU input to the connector labeled IN2.

2.4.3.3 Output 1, Output 2

The Syrinx-DualVME has two FM demodulators per card. Throughout this manual these will be referred to as Demod 1 and Demod 2 and will correspond with the connectors labeled OUT1 and OUT2 respectively.

2.4.3.4 PCM Output

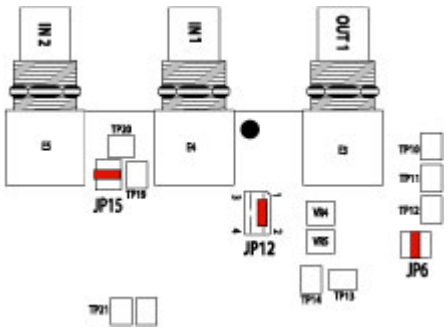
The Syrinx-DualVME card is equipped with a PCM frame generator that will create an NRZL or RNRZL data stream containing demodulated data from selected channels within the system. The Syrinx-DualVME card identified as Board 0 will provide the PCM output for cards within the system.

2.4.3.5 PCM Clock Output

The PCM Clock output provides 0° or 180° bit clock for the PCM output, program selectable.

2.5 Input Impedance

The Input Impedance of the Syrinx-DualVME card is jumper selectable for 50, 75, or 10K Ohms. The Syrinx-Demux System is shipped from the factory with all cards set in the 10K Ohms position. The jumper selection sets the Input Impedance for both the Subcarrier Input (IN1) and the LRU Input (IN2). The input impedance can be changed by moving the jumper to the appropriate location. **REMOVE AND HANDLE SYRINX-DUALVME CARDS ONLY IN AN ESD SAFE AREA.** Special care must be taken in applications where the input signal is connected to multiple Syrinx-DualVME cards and the desired input impedance is either 50 or 75 Ohms. Install the jumper in the 50 or 75 Ohm position on **only one** Syrinx-DualVME board. Install all other jumpers in the 10K Ohm position. Significant input signal loading will occur if multiple cards have jumpers installed in the 50 or 75 Ohm locations.



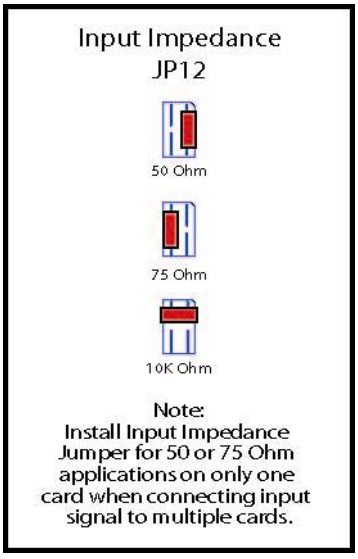


Figure 6 - Input Impedance Jumper

2.6 Setting Syrinx-DualVME Board Base VME Address and ID

The individual base VME address and ID for each Syrinx-DualVME card included in your Syrinx-Demux System will be set at the factory. The following information is useful if you replace a card within your Syrinx-Demux System or add cards to the system.

Each Syrinx-DualVME card must be assigned a unique base address by setting board switches SW1, SW2 and SW3 on the board. The Board ID LEDs (see Figure below) reflect the value of SW1. Ulyssix recommends that you assign sequential board IDs (SW1) to the cards installed in your chassis and use SW2 and SW3 to offset this group of addresses if a conflict exists with other hardware in the chassis. Note that the Board IDs are numbered 0 through 15. Refer to the Figure and Table below to see the correlation between SW1 setting, Board ID, and the Board ID LEDs on the front panel.

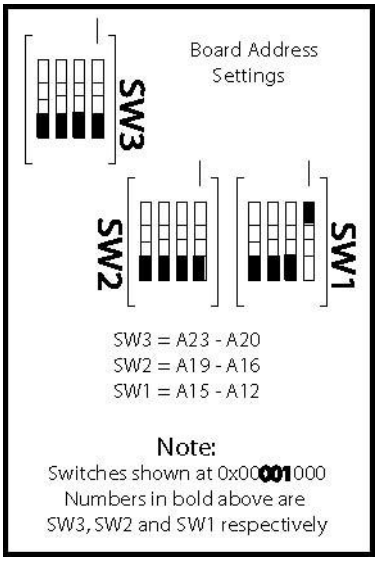


Figure 7 - Board ID Switch Settings

2.7 LED Indicators

LED Indicators on the front panel of the Syrinx-DualVME card provide identification and status for each card. The following sections describe the function of each LED.

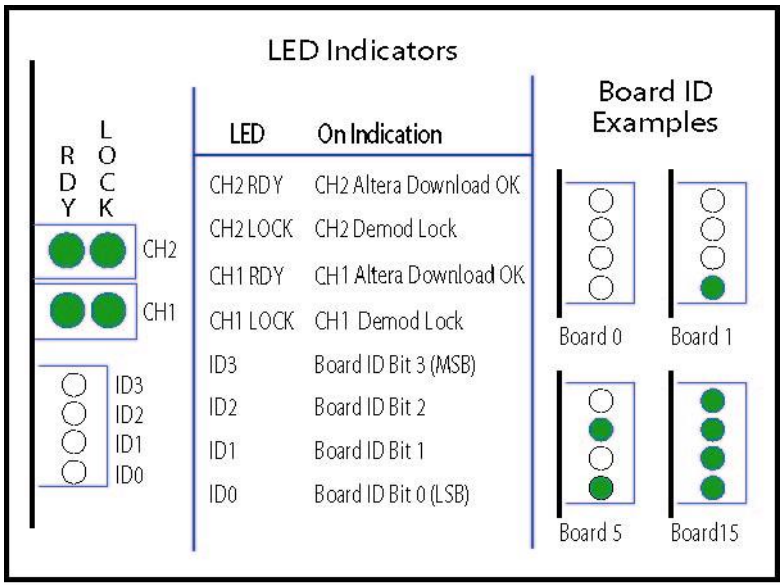


Figure 8 - LED Indicators

Note: 0 indicates LED off, 1 indicates LED on.

SW1	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
ID 3	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
ID 2	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1
ID 1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
ID 0	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
Board ID	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**

Figure 9 - Board ID Table

2.7.1 Altera Download OK (RDY)

DSP algorithms are downloaded from on-board flash into Altera FPGAs upon power up of the Syrinx-DualVME. RDY, the Altera Download OK light, will illuminate after power up once the Altera FPGAs have successfully received the download. A RDY light for each channel will be illuminated during normal operation. If the Altera Download OK light is not illuminated after power up, contact the factory for assistance.

2.7.2 Demod Lock (LOCK)

The Demod Lock LED, LOCK, will illuminate green when the Syrinx-DualVME has detected data within the programmed Subcarrier and Deviation setup parameters for that channel. This LED will either illuminate green or flash green during normal operation. If the Lock LED is indicating NO LOCK when you expect it should be “locked”, please verify that the board is not demodulating before contacting the factory for support. See section below on Demod LOCK LED sensitivity adjustment.

2.7.3 Demod ID (ID)

The Demod ID for each card is determined by the setting of SW1 on the card. The Demod ID LEDs give a binary representation of the Demod number. Note that the cards are numbered 0 through 15. The Demod number and channel number (1 or 2) appear on all screens of the software to identify setup, status, and data to a specific Syrinx-DualVME card and channel. Refer to the Figure and Table above to determine the Demod number. Each Syrinx-DualVME card should have a unique, sequential Demod ID number.

2.8 Adding Cards to an Existing System

Additional Syrinx-DualVME cards can be installed into your Syrinx-Demux System with a maximum of 11 cards per system (22 channels). Each Syrinx-DualVME card adds two demodulator channels to your system.

Electrostatic Discharge (ESD) Precautions should be taken to prevent damage while installing or removing Syrinx-DualVME cards.

Install additional cards into the Syrinx-Demux System as follows:

- Shut down the Syrinx-Demux system and turn off power.
- Protect the hardware by grounding yourself with an ESD wrist strap in a static protected area.
- Remove the blank panel that covers the next available slot in the Syrinx-Demux Chassis.
- Determine the next available board ID. Standard configuration from the factory sets the leftmost card in the chassis (next to the CPU) to 0. Each card increments the ID by 1. Refer to the board ID information above for more information.
- Set the board ID of the card to be installed by setting board switches SW1, SW2, and SW3 as described above. You should only have to set SW1.
- Confirm that the input impedance jumper is installed at the proper location. Refer to the section on setting input impedance above. Typical setting is 10K Ohms.
- Install the Syrinx-DualVME card in the available slot making sure that it is properly seated in the back-plane connector. Push the card into place using the handles.
- Secure the card into place using the captive screws next to each of the two handles.
- Cover any unfilled VME slots with blank panels.
- Turn on power and launch the Syrinx-Demux software.
- Confirm that the card is properly installed by checking the board ID LEDs and locating the card in the GUI software.

Chapter 3 Operation

3.1 Demodulator Setup and Operation

The following sections describe the various screens of the Windows based Syrinx-Demux software. Sections 3.1.1 through 3.1.3 give information about the Syrinx-Demux Status Screen including the menu bar. Section 3.1.4 gives instructions on how to setup the demodulator channels. Section 3.1.5 explains the operation of the FFT screen.

3.1.1 Syrinx-Demux Status Screen

The Syrinx-Demux Status Screen is the first screen you see when the Syrinx-Demux software is launched. This screen displays a Demod Status Block for each demodulator channel detected (2 per Syrinx-DualVME card installed). Software and DLL version numbers are displayed in the status bar at the bottom of the screen. Several drop down menu options are available and are discussed later in the manual.

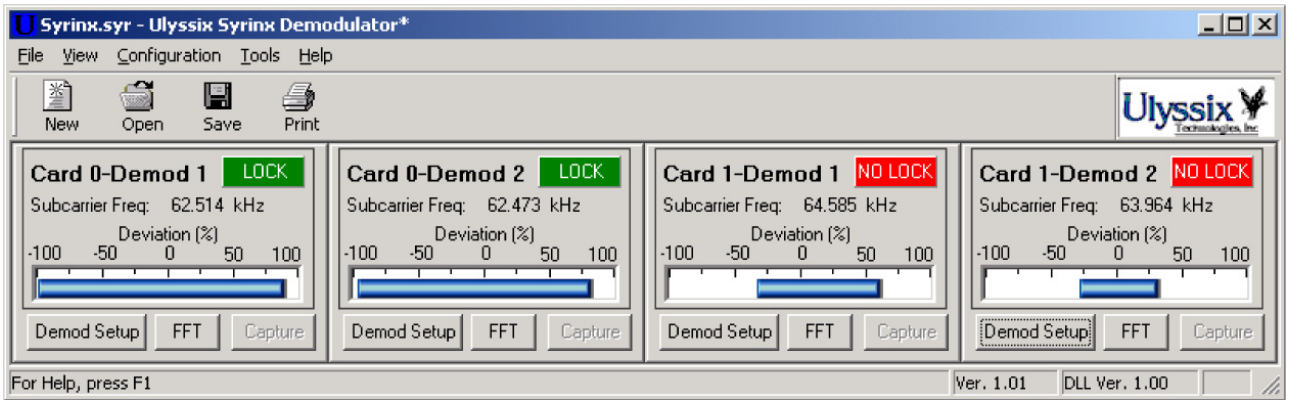


Figure 10 - Syrinx-Demux Status Screen

3.1.2 Demod Status Block

A Demod Status Block for each demodulator channel (2 per Syrinx-DualVME card) appears on the Syrinx-Demux Status Screen displaying status information for each demodulator channel. Each channel is identified by Card number and Demod number. The fields displayed on the Demod Status Block are explained below.

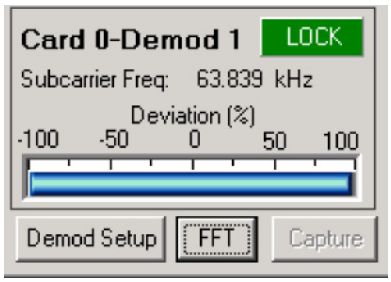


Figure 11 - Demod Status Block

3.1.2.1 Channel Number

Each demodulator channel is identified by Card number and Demod number. The Card number corresponds to the switch setting of SW1 and the Demod ID LEDs on the back of the card (refer to the hardware section of this manual). This number assists the user in identifying the various Syrinx-DualVME cards in a given chassis. The Demod number corresponds to Demod 1 (OUT1) and Demod 2 (OUT2) of each card.

3.1.2.2 Lock Indicator

The Lock Indicator, located in the top right corner of the Demod Status Block, will be green when subcarrier with data is detected in the programmed channel of interest. Red "NO LOCK" indicates no subcarrier is present. The sensitivity of the Lock Indicator can be adjusted. See the section on Demod Lock LED Sensitivity. If the Lock LED is indicating NO LOCK when you expect it should be "locked", please verify that the board is not demodulating before contacting the factory for support. Optionally, the Demod Lock Status indicator can be disabled and removed from the main display. See Menu Bar Features/Tools below for more details.

3.1.2.3 Deviation Meter

The Deviation Meter provides a graphical representation of the demodulated data for the programmed channel. The blue indicator shows the percent deviation for the channel. This is useful for pre-test checkout of the system. The Deviation Meter is updated based on a "boxcar" average of multiple data points. The number of data points averaged for the display is selectable to allow the user to adjust the response. See section on Configuration / Deviation Display for details.

3.1.2.4 Frequency Counter

The Frequency Counter displays the actual frequency of the carrier if the demodulator is locked. This portion of the display can be turned on or off to suit your preference. To change the status of this display, select Configuration from the main screen menu bar and select Freq Subcarrier Counter.

3.1.2.5 Demod Setup

Click this button to enter the Demod Setup screen. The Demod Setup information is explained below.

3.1.2.6 FFT

Click this button to enter the FFT screen. FFT information is explained below.

3.1.2.7 Capture

This feature is not currently implemented.

3.1.3 Menu Bar Features

The menu bar and the toolbar provide access to configuration, status, and help screens, as well as control of standard Windows functions such as file management and printing. The toolbar consists of a group of icons that provide quick access to the file management and print control screens. The specific use of these functions is explained below.

3.1.3.1 File

Each time the Syrinx-Demux software is executed, the most recently downloaded set up parameters are loaded into the Syrinx-DualVME cards in your chassis. The active file format name (with a .syr extension) will be displayed at the top of the Syrinx-Demux Status Screen (See Figure Below). Available from the Syrinx-Demux Status Screen is the File management menu. Click File at the top left corner of the Syrinx-PCI Status Screen to save, save as, or recall saved program formats. This feature of the Syrinx-Demux software eliminates the need to re-enter set up information for frequently used channel combinations. The software will ask you if you want to save setup information each time you exit. You are also able to exit the Syrinx-Demux software from this drop down menu. The following paragraphs describe the functions available from the File dropdown list.

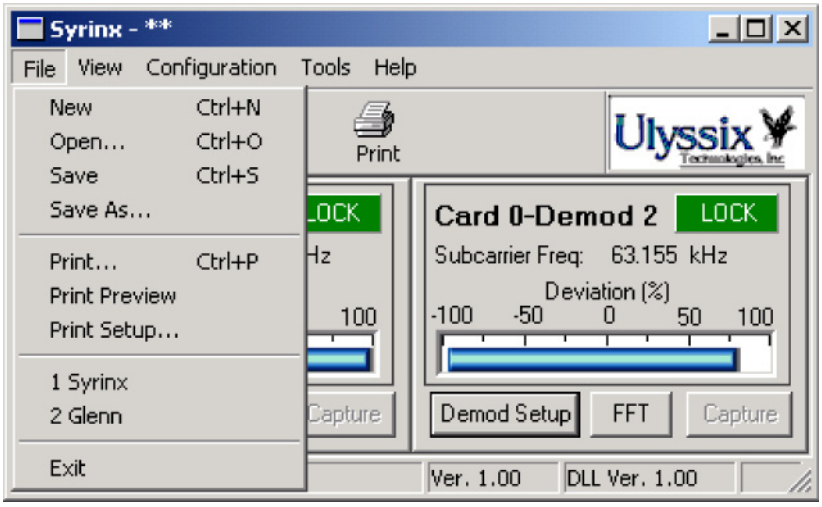


Figure 12 - File Format Screen

3.1.3.1.1 File / New

Click New to create a new configuration file. The default setup parameters will be loaded into the Demod Setup screen. You will be asked if you want to save the existing format file if it has been modified and not saved.

3.1.3.1.2 File / Open

Click Open to load an existing format file. Valid format files for the Syrinx-Demux software will have a .syr file extension. Select the file name to load and hit Open. The setup parameters will be downloaded to the Syrinx-DualVME cards in your chassis. See Figure Below, Open a Format File. You must be looking in the correct directory for previously saved format files. Care should be taken when saving files to note the saved location.

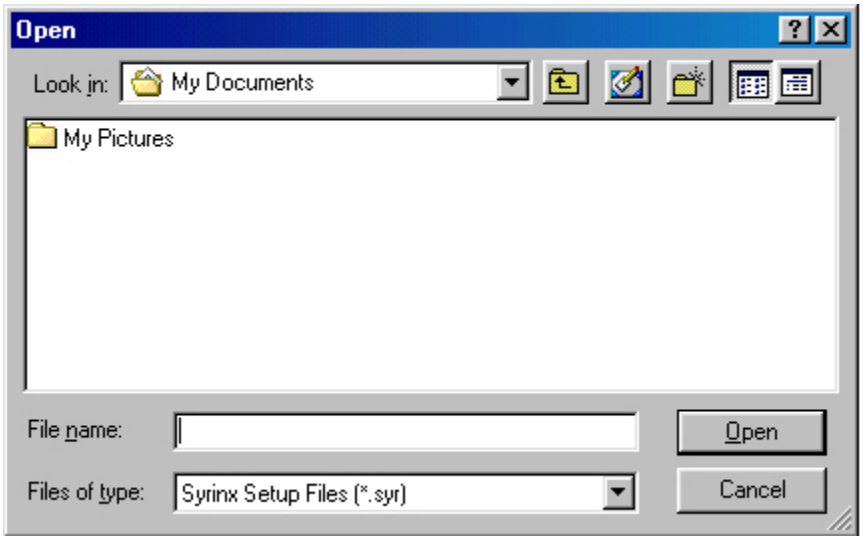


Figure 13 - Open a Format File

3.1.3.1.3 File / Save

After entering and applying setup configuration parameters to the Syrinx-DualVME cards in your chassis, you can save this information for later use. Click on File at the top left corner of the Syrinx-Demux Status Screen and choose Save. The displayed directory for saved formats will be the last directory you saved into. Ulyssix suggests that you save your format files in the same directory where the Syrinx-Demux program resides. The software install shield defaults to C:\Program Files\Ulyssix\Syrinx-Demux. Identify the file format with a name that will be easily recognized for future loading.

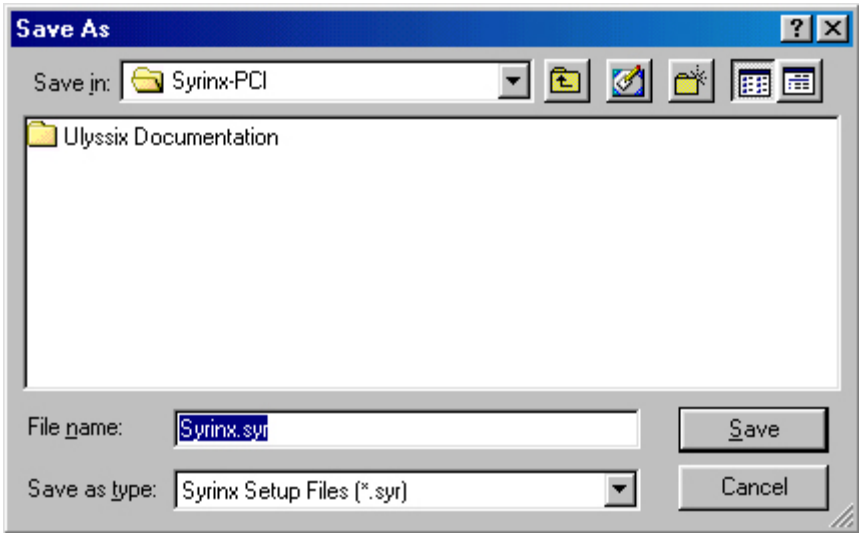


Figure 14 - Saving a Format File

3.1.3.1.4 File / Save As

Use the “Save As” option to copy the format to another name for modification. You can also use the Save As option if you have made changes to an existing format but want to retain the original format for future use.

Click on File at the top left corner of the Syrinx-Demux Status Screen and choose SaveAs. The displayed directory for saved formats will be the last directory you saved into. Ulyssix suggests that you save your format files in the same directory where the Syrinx-Demux program resides. The software install shield defaults to C:\Program Files\Ulyssix\Syrinx-Demux. Identify the file format with a name that will be easily recognized for future loading.

3.1.3.1.5 File / Print

A Syrinx Configuration Report can be printed either by selecting print from the File dropdown menu or by clicking the Print icon from the toolbar. The printed document will contain all setup information for all detected Syrinx-Demux demodulator channels in your system.

3.1.3.1.6 File / Print Preview

Print Preview allows you to view the Syrinx Configuration Report on your computer screen. The Syrinx Configuration document will contain all setup information for all detected Syrinx-Demux demodulator channels in your system.

3.1.3.1.7 File / Print Setup

Print Setup is a standard Windows print setup screen.

3.1.3.2 View

The View drop-down menu (See Figure Below) allows you to display or hide the toolbar and the status bar on the Syrinx-Demux Status Screen. The toolbar is the group of icons including New, Open, Save, and Print. The status bar is the bar of information displayed at the bottom of the screen that displays the software and dll version information.

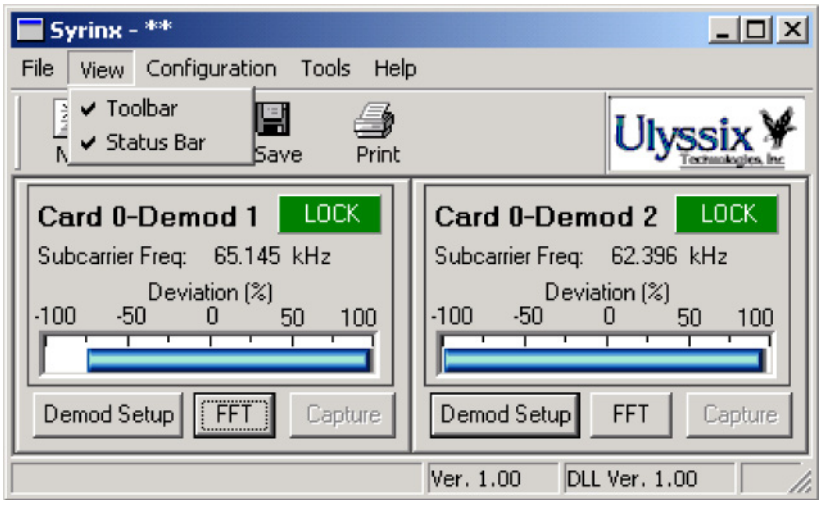


Figure 15 - View

3.1.3.3 Configuration

The Configuration drop-down menu (See Figure Below) allows you to alter several attributes of the main screen.

3.1.3.3.1 Configuration / Freq Subcarrier Counter

The Demod Status Block for each channel provides a graphical representation of the channel data both in percent deviation and Carrier Frequency in kHz. The frequency counter can be turned on or off by selecting or deselecting “Freq Subcarrier Counter” from the configuration drop down menu.

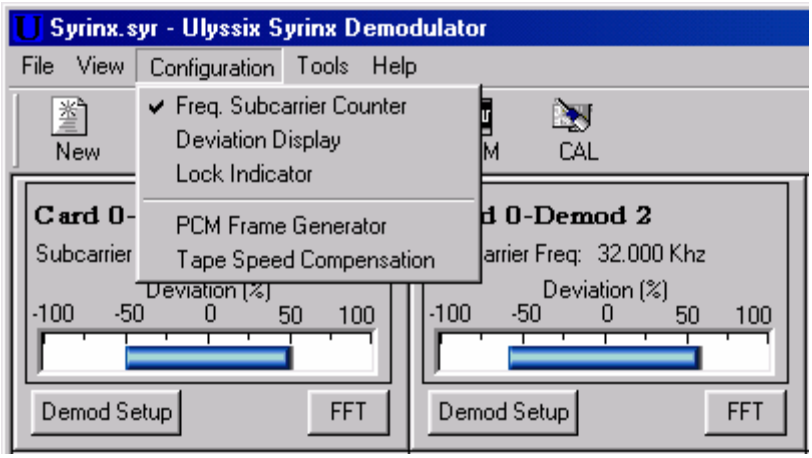


Figure 16 - Configuration Drop Down Menu

3.1.3.3.2 Configuration / Deviation Display

The data displayed on the graphical Deviation percent display is derived from a "boxcar" average of several output data values from the digital demodulator. The Syrinx-Demux software averages from 1 to 32 data values then updates the display. The oldest value is then discarded and replaced by the newest available data in a first in first out process. The number of values to be averaged is selectable by clicking on "Deviation Display" from the Configure drop down menu (See Figure Below). Enter a number between 1 and 32. The higher the number, the more data points averaged and the DC offset level of the demodulator output data is displayed. The lower the number, the fewer data points averaged, and deviation display represents the AC frequency response of the demodulator output data. The setup on the deviation display does not in any way effect the demodulator operation; it is merely there to allow the user to change the update rate of the deviation display to quick view either the AC or DC response of the demodulator.

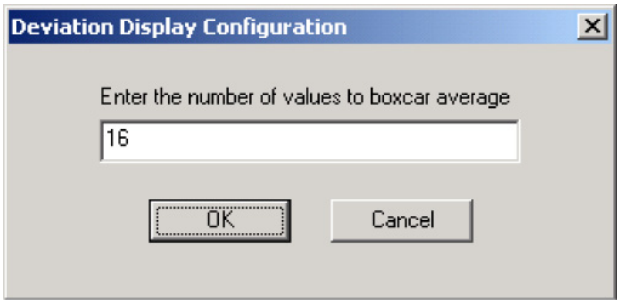


Figure 17 - Deviation Display

3.1.3.3.3 Configuration / Lock Indicator

The Lock Indicator, located in the top right corner of the Demodulator Status Block, will be green when sub-carrier with data is detected in the programmed channel of interest. The lock indicator can be turned on or off by selecting or deselecting "Lock Indicator" from the configuration drop down menu.

3.1.3.3.4 Configuration / PCM Frame Generator

The on-board PCM Frame Generator creates an NRZL or RNRZL serial PCM data stream containing data from selected demodulator outputs. Refer to section 3.1.6 for detailed information about the PCM Frame Generator.

3.1.3.3.5 Configuration / Tape Speed Compensation

The Tape Speed Compensation feature of the Syrinx-Demux system compensates for wow and flutter sometimes present when playing back analog tape. The reference oscillator of your multiplex is demodulated and the corresponding data is used to compensate selected data demodulator channels. To use the Tape Speed Compensation feature, program the Card0 Demod1 channel for the reference oscillator frequency and deviation and select the channels you want to compensate from the Tape Speed Compensation screen. Click the Enable button and then click the apply button to download your selection.

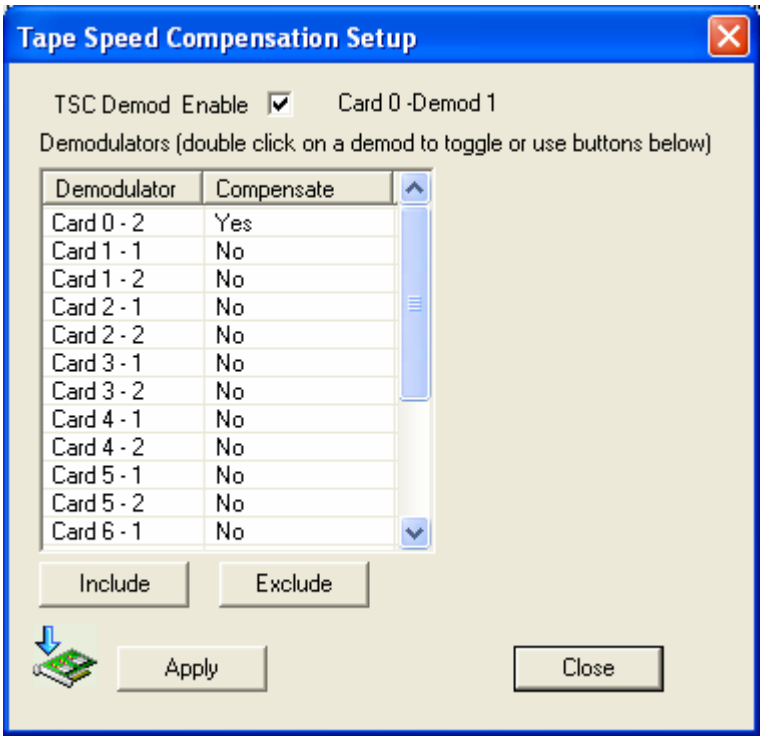


Figure 18 - Tape Speed Compensation Screen

3.1.3.4 Lock Indicator

The Lock Indicator, located in the top right corner of the Demodulator Status Block, will be green when sub-carrier with data is detected in the programmed channel of interest. The lock indicator can be turned on or off by selecting or deselecting “Lock Indicator” from the configuration drop down menu.

3.1.3.5 Tools

The Tools dropdown menu allows you to open the Syrinx-Demux software debug screen and the demodulator delay screen.

3.1.3.5.1 Debug

This screen is used at the factory to access the registers of the Syrinx-DualVME boards. Typically a user will not access the debug screen. In some instances, however, there may be a need to open the debug screen for troubleshooting purposes. Ulyssix recommends that you not attempt to use the debug screen without consulting the factory.

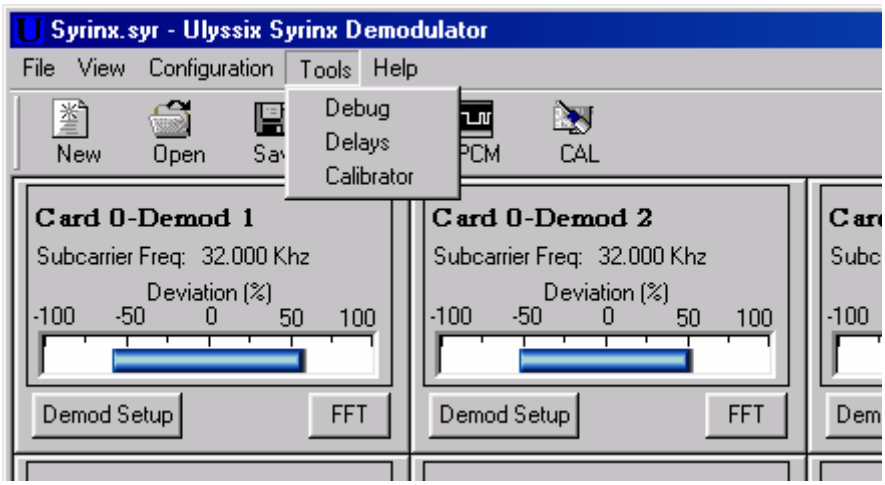


Figure 19 - Tools

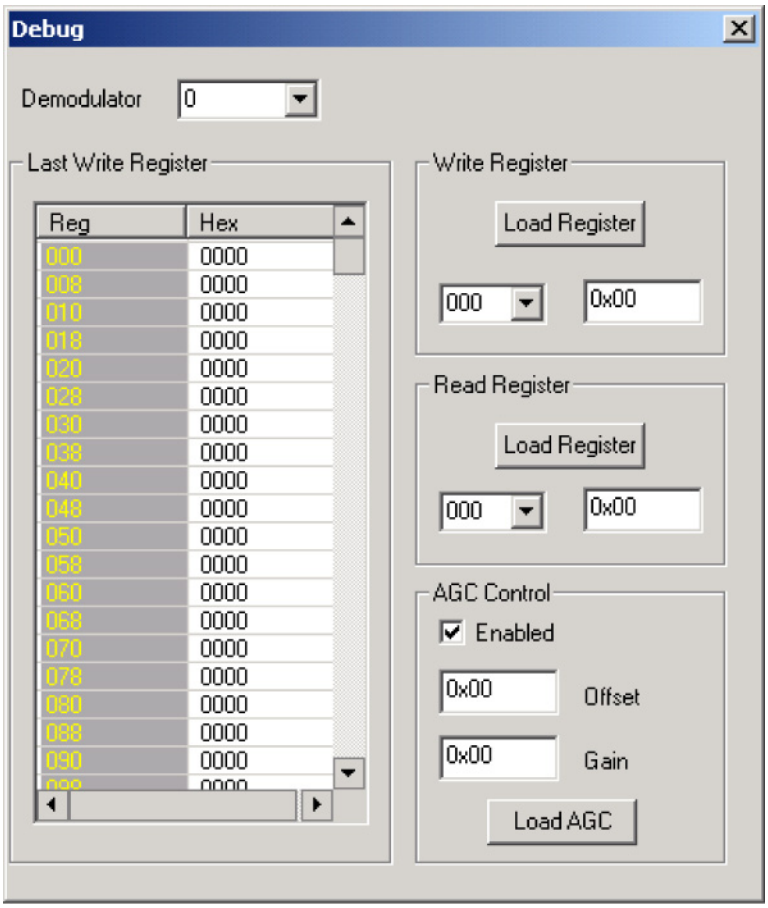
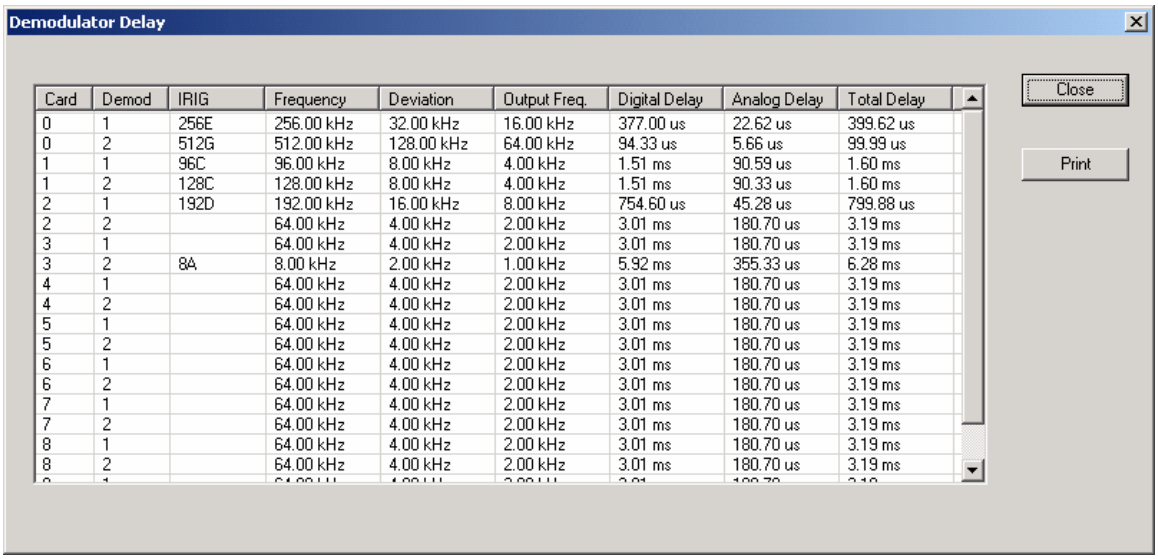


Figure 20 - Debug Screen

3.1.3.5.2 Delay

The Demodulator Delay display indicates data delays through the demodulator circuit. The delays are shown independently for each demodulator channel with the time broken down as digital delay, analog delay and total delay. The delay screen calculates and displays the delays for the current setup. A hard copy can be generated by pressing the print button.



Card	Demod	IRIG	Frequency	Deviation	Output Freq.	Digital Delay	Analog Delay	Total Delay
0	1	256E	256.00 kHz	32.00 kHz	16.00 kHz	377.00 us	22.62 us	399.62 us
0	2	512G	512.00 kHz	128.00 kHz	64.00 kHz	94.33 us	5.66 us	99.99 us
1	1	96C	96.00 kHz	8.00 kHz	4.00 kHz	1.51 ms	90.59 us	1.60 ms
1	2	128C	128.00 kHz	8.00 kHz	4.00 kHz	1.51 ms	90.33 us	1.60 ms
2	1	192D	192.00 kHz	16.00 kHz	8.00 kHz	754.60 us	45.28 us	799.88 us
2	2		64.00 kHz	4.00 kHz	2.00 kHz	3.01 ms	180.70 us	3.19 ms
3	1		64.00 kHz	4.00 kHz	2.00 kHz	3.01 ms	180.70 us	3.19 ms
3	2	8A	8.00 kHz	2.00 kHz	1.00 kHz	5.92 ms	355.33 us	6.28 ms
4	1		64.00 kHz	4.00 kHz	2.00 kHz	3.01 ms	180.70 us	3.19 ms
4	2		64.00 kHz	4.00 kHz	2.00 kHz	3.01 ms	180.70 us	3.19 ms
5	1		64.00 kHz	4.00 kHz	2.00 kHz	3.01 ms	180.70 us	3.19 ms
5	2		64.00 kHz	4.00 kHz	2.00 kHz	3.01 ms	180.70 us	3.19 ms
6	1		64.00 kHz	4.00 kHz	2.00 kHz	3.01 ms	180.70 us	3.19 ms
6	2		64.00 kHz	4.00 kHz	2.00 kHz	3.01 ms	180.70 us	3.19 ms
7	1		64.00 kHz	4.00 kHz	2.00 kHz	3.01 ms	180.70 us	3.19 ms
7	2		64.00 kHz	4.00 kHz	2.00 kHz	3.01 ms	180.70 us	3.19 ms
8	1		64.00 kHz	4.00 kHz	2.00 kHz	3.01 ms	180.70 us	3.19 ms
8	2		64.00 kHz	4.00 kHz	2.00 kHz	3.01 ms	180.70 us	3.19 ms

Figure 21 - Demodulator Delay Screen

3.1.3.5.3 Calibrator

Click this button to enter the Hallux Calibrator screen. The Calibrator setup and operation information is explained below.

3.1.3.6 Help

Select “Manual” from the Help drop down menu to view the User Manual. Adobe Acrobat Reader version 4.0 or above is required to view the manual. Select “About” from this drop down menu to view the Software version and release date.

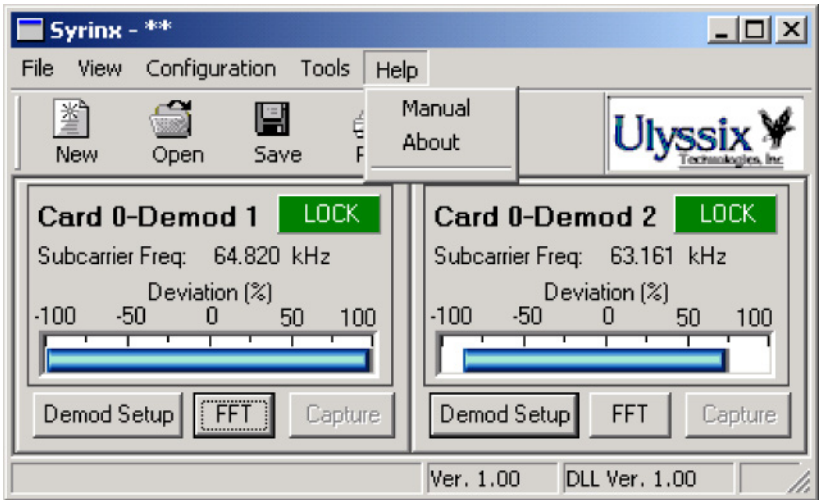


Figure 22 - Help

3.1.4 Demodulator Setup

The Demodulator Setup Screen allows the user to program specific parameters of each Syrinx-DualVME card installed in the system. The various setup parameters are discussed below. Please note that you must click the Apply button to download any modified settings to the Syrinx-DualVME cards. No changes will be made until Apply has been clicked.

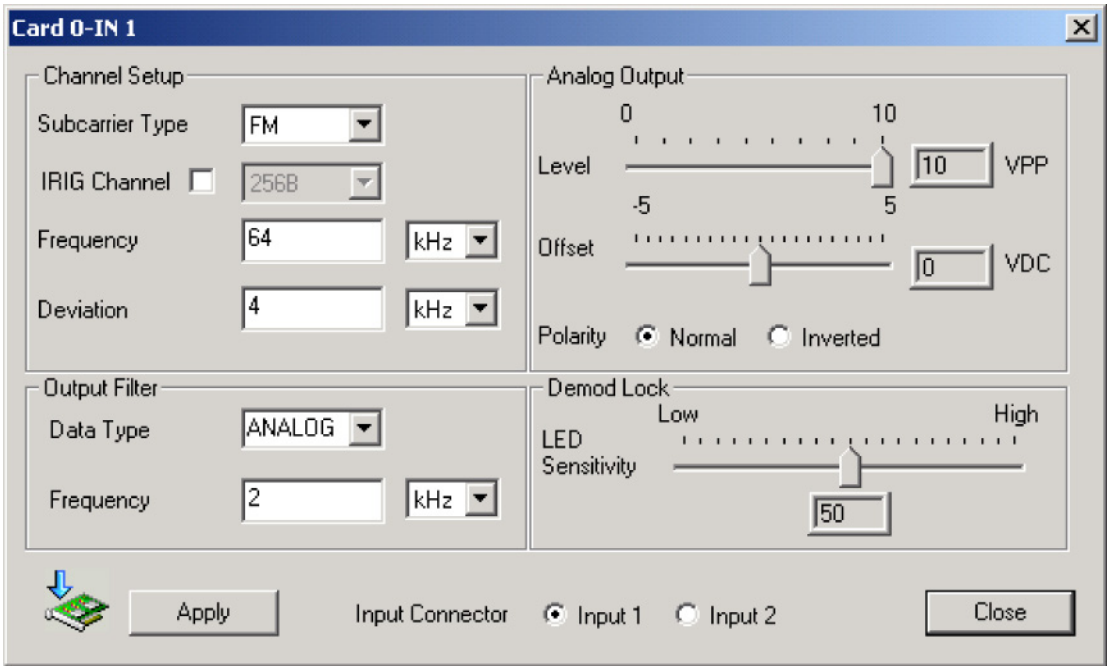


Figure 23 - Demod Setup Screen

3.1.4.1 Subcarrier Type

Select the appropriate demodulation mode for the selected channel from the drop down menu. Choose FM or FSK.

3.1.4.2 IRIG Channel

When demodulating a standard IRIG channel, click the IRIG Channel box and select the appropriate IRIG channel from the drop down menu. The Frequency, Deviation, and Output Filter will be automatically entered.

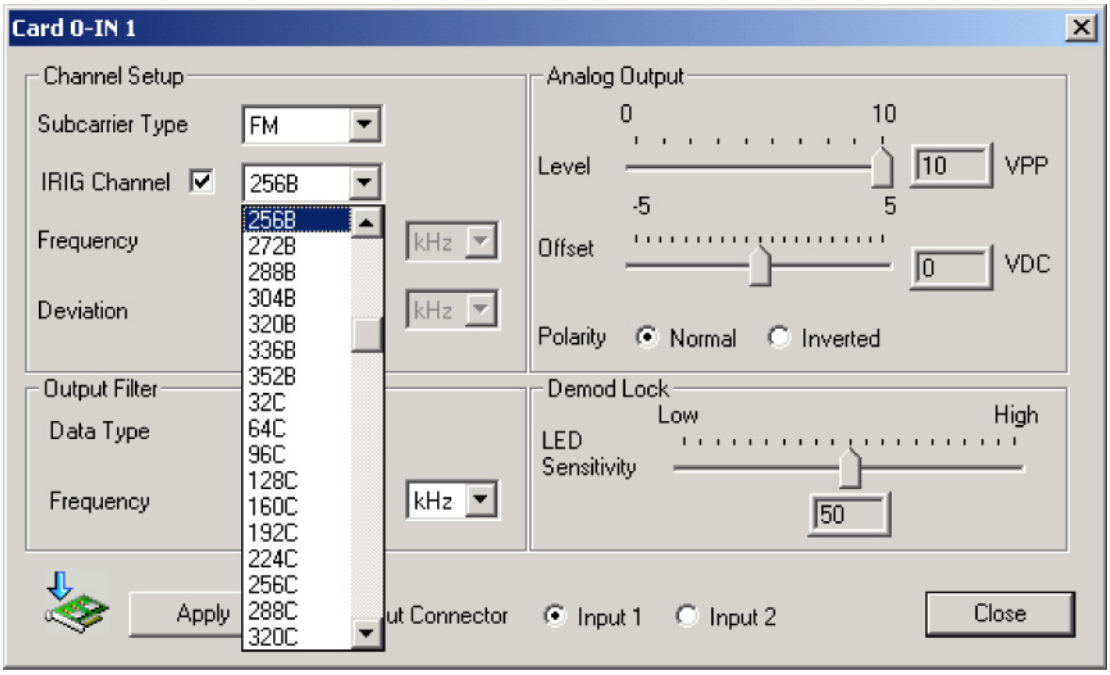


Figure 24 - IRIG Channel

3.1.4.3 Frequency

Enter the subcarrier frequency of the channel to be demodulated. The Syrinx-Demux Digital Demultiplexing System supports IRIG and non-IRIG subcarriers from 250 Hz to 3.5 MHz. Select the unit of measure from the drop down menu to the right of the Frequency. Select Hz, kHz, or MHz. An error message will be displayed if a Frequency is entered that is not within the allowable range. The Frequency field is not accessible if you have selected an IRIG channel. It will, however, display the Frequency that corresponds to the selected IRIG channel.

3.1.4.4 Anti-Alias Filtering

The Syrinx-DualVME card has an anti-alias filter in the analog front-end section of the board that is applied to both demodulator channels to eliminate unwanted frequency terms before digitizing. One of two anti-alias filter settings is automatically chosen based on the programmed upper band edge of Demod 1 of the card. The upper band edge is calculated by adding the programmed Subcarrier Frequency plus the programmed Deviation. Since the same anti-alias filter is applied to both channels on the board, care must be taken to group channels correctly. The edge of the two filter ranges is 14,648.4 Hz. Take care to group your channels such that within a given card the upper band edges of both channels are 14,648.4 Hz or below, or the upper band edges of both channels are above 14,648.4 Hz.

3.1.4.5 Deviation

Enter the Deviation of the channel to be demodulated. The Syrinx-DualVME card supports FM deviations from 0.5 to 50% of the entered center frequency. Select the unit of measure from the drop down menu to the right of the Frequency. Select Hz, kHz, or MHz. An error message will be displayed if a Deviation is entered that is not within range. The Deviation field is not accessible if you have selected an IRIG channel. It will, however, display the Deviation that corresponds to the selected IRIG channel.

3.1.4.6 Output Filter Data Type

Select the desired output filter type from the drop down menu (See Figure Below). Each filter type is explained below.

Analog Mode (Linear Data): The Output FIR filter is programmed to be flat within 0.1 dB to cutoff (programmed output filter frequency) and -60 dB attenuation at 2 times cutoff.

Digital Mode (PCM Data): The Output FIR filter is programmed to be monotonic in the passband with -3 dB attenuation at the programmed cutoff frequency, and down -50 dB at 2.5 to 3.0 times the programmed cutoff frequency.

OFF Mode (>1MHz Data): The digital and analog reconstruction filters are bypassed for maximum digital data throughput, up to 2.7 Mbps NRZL. The data frequency throughput is equal to the programmed deviation frequency.

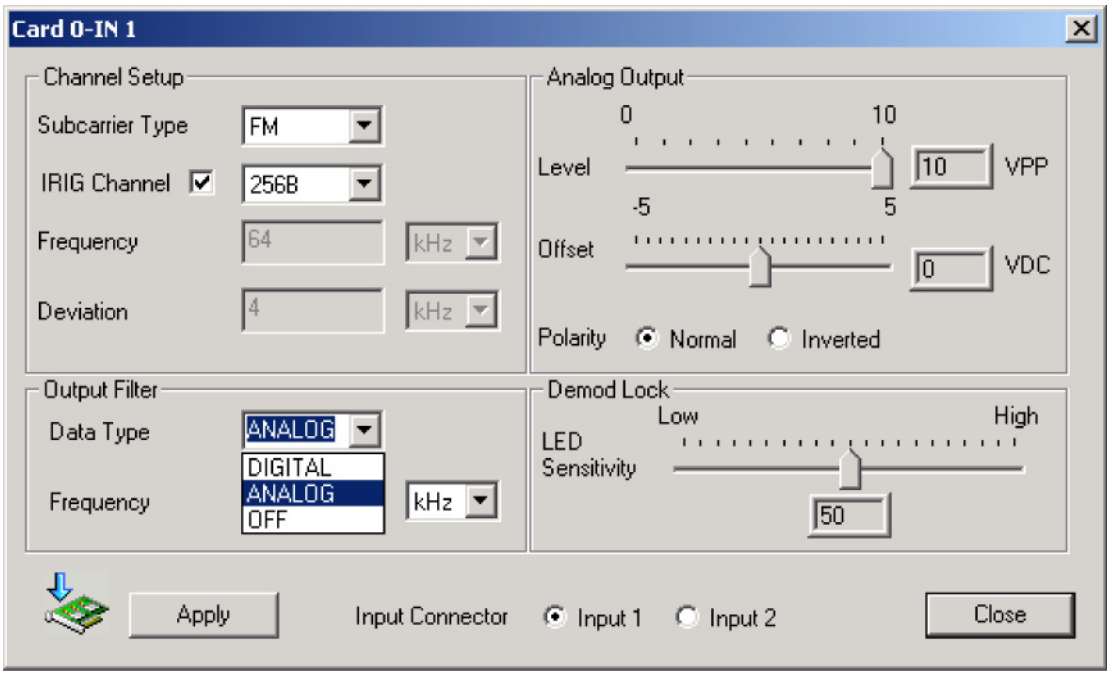


Figure 25 - Output Filter Data Type

3.1.4.7 Output Filter Frequency

The permitted output filter range is determined by the programmed deviation for the channel. Refer to the following table to determine the minimum and maximum allowable output filter frequency settings for the programmed deviation.

Programmed Deviation Range		Permitted Output Filter Range	
Deviation >=	**Deviation <**	**Minimum**	**Maximum**
750 kHz	1500 kHz	11718.8 Hz	1500 kHz
375 kHz	750 kHz	5859.4 Hz	750 kHz
187.5 kHz	375 kHz	2929.7 Hz	375 kHz
93.75 kHz	187.5 kHz	1464.8 Hz	187.5 kHz
46.875 kHz	93.75 kHz	732.4 Hz	93.75 kHz
23437.5 Hz	46.875 kHz	366.2 Hz	46.875 kHz
11718.8 Hz	23437.5 Hz	183.1 Hz	23437.5 Hz
5859.4 Hz	11718.8 Hz	91.6 Hz	11718.8 Hz
2929.7 Hz	5859.4 Hz	45.8 Hz	5859.4 Hz
1464.8 Hz	2929.7 Hz	22.9 Hz	2929.7 Hz
732.4 Hz	1464.8 Hz	11.4 Hz	1464.8 Hz
366.2 Hz	732.4 Hz	5.7 Hz	732.4 Hz
183.1 Hz	366.2 Hz	2.9 Hz	366.2 Hz
91.6 Hz	183.1 Hz	1.4 Hz	183.1 Hz
45.8 Hz	91.6 Hz	0.7 Hz	91.6 Hz

Figure 26 - Deviation vs. Output Filter Range Table

3.1.4.8 Analog Output Level

The Analog Output Level setting affects only the analog output of the demodulator as seen on the Output Connector OUT. Click and drag the slide box to adjust the peak-to-peak output voltage level within a range of one to ten volts.

3.1.4.9 Analog Output Offset

The Analog Offset setting affects only the analog offset of the demodulator as seen on the Output Connector OUT. Click and drag the slide box to adjust the analog offset to be applied to the output within a range of –5VDC to +5VDC. The combination of output level and output offset cannot exceed a maximum output rail of +- 8VDC.

3.1.4.10 Output Polarity

The Output Polarity setting affects only the analog output of the demodulator as seen on the Output Connector OUT. In Normal Mode, a subcarrier deviation of +100% results in the maximum positive output voltage as determined by the Analog Output Level and Analog Output Offset settings. In Inverted Mode, a deviation of +100% results in the maximum negative output voltage as determined by the Analog Output Level and Analog Output Offset settings. Select the appropriate radio button.

3.1.4.11 Demod Lock LED Sensitivity

Click and drag the slide box to adjust the sensitivity of the Demod Lock LED indicator. The default value for the sensitivity is 50%. If you have confirmed that the Syrinx-DualVME is demodulating properly and the Lock LED is not green, adjust the LED sensitivity by moving the box to the left. If the Lock Light is always green, even when the Syrinx-DualVME is not demodulating, adjust the sensitivity by moving the box to the right. This adjustment does not change the sensitivity of the demodulator. It simply adjusts the sensitivity of the LED indicator.

3.1.4.12 Input Connector

The Syrinx-DualVME card provides the user with the ability to select one of two connected inputs. This is typically used to connect a calibration signal to the demodulator to verify system integrity prior to a test. Select the radio button for the desired input connector. The Input Connector radio buttons are only active on the Demod Setup screen for Demod 1 of each card.

3.1.4.13 Apply

Click the Apply button to download the modified settings to the specified channel. No changes will be made until Apply has been clicked.

3.1.4.14 Close

Click the Close button to close the Demod Setup Screen. If you have changed any settings and have not downloaded by clicking the Apply button, your changes will not be lost until you close the program. If you reopen the Demod Setup Screen before you exit the program, the unapplied parameters will still be there.

3.1.5 FFT Screen

The FFT Screen (See Figure Below) allows the user to view demodulated data in both the frequency and time domains.

3.1.5.1 FFT Window

Select the desired FFT window from the drop down menu. Select from Hamming, Hanning, Blackman, and Rectangular.

3.1.5.2 Frequency Domain

Enter the min and max values in dB for the frequency domain display. The display screen will automatically scale. This allows the user to view data in a very specific range.

3.1.5.3 Time Domain

Enter the min and max values in percent deviation for the time domain display.

3.1.5.4 FIFO Dominant Frequency

The displayed dominant data frequency is the largest amplitude frequency term determined by the FFT in kHz.

3.1.5.5 Pause / Resume

The Pause/Resume button allows you to temporarily prevent the display from being updated. Click the button again to resume. This feature allows the user to view and analyze the displayed data.

3.1.5.6 Single New Data

The Single New Data feature captures one 1024-point FFT amount of data. This feature is similar to the single sweep feature on many oscilloscopes.

3.1.5.7 FFT Screen Parameters

The Frequency Domain units of measure are in kHz in the X-Axis and dB in the Y-Axis. The Time Domain units of measure are in msec in the X-Axis and in % Deviation in the Y-Axis.

3.1.5.8 Print

The Print button creates a hard copy of the FFT frequency and time displays along with the current FFT settings.

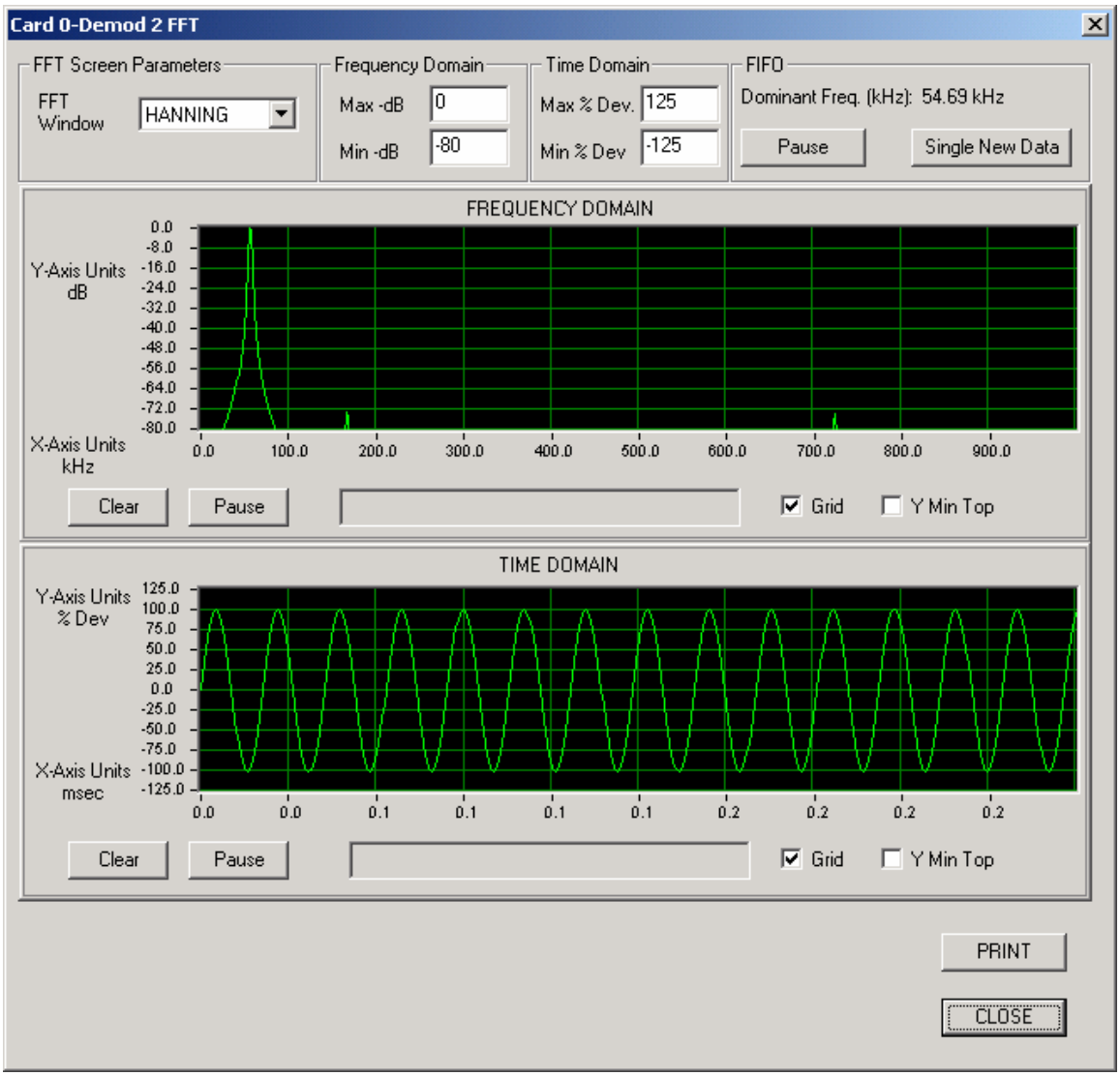


Figure 27 - FFT Screen

3.1.6 PCM Frame Generator

The on-board PCM Frame Generator creates an NRZL or RNRZL serial PCM data stream containing data from selected demodulator outputs. The various fields of the PCM Frame Generator Screen are explained in the following paragraphs. It is helpful to know that the individual channel sample rates are determined by the channel output filter setting. You can often reduce the overall bit rate of the PCM output by setting the individual demodulator channel output filters as low as possible.

3.1.6.1 PCM Card Master

The PCM Card Master is the Syrinx-DualVME card in th4e Demux System hat is generating the PCM output. This is always Card 0. PCM output (PCM) and PCM Clock (PCM CLK) signals are available on the front panel of Card 0.

3.1.6.2 SF Sync Type

Select the desired Sub Frame Sync Type from the drop down menu. Select from Sub Frame ID (SFID), Frame Code Compliment (FCC), or None.

3.1.6.3 Output Code Type

Select the desired Output Code Type from the drop down menu. Select from Non Return to Zero (NRZ-L) or Randomized Non Return to Zero (RNRZ-L).

3.1.6.4 Un-Used Words Fill

The PCM Frame Generator allows you to insert a specific value for all unused words. Enter a 16 bit decimal value.

3.1.6.5 Points/Period

The PCM Frame Generator allows you to select the number of points per period of each sample. This value determines how fast the PCM frame engine samples the demodulator output data. This value will directly affect the PCM bit rate.

3.1.6.6 Include / Exclude

Select the demodulator output data to include in the PCM stream. You can either include / exclude by double clicking the desired channel or by highlighting the desired channel and clicking either the Include button or the Exclude button. Click the Apply button to download the configuration to the PCM Generator.

3.1.6.7 PCM Frame Configuration Information

The PCM Frame Generator automatically creates an optimized PCM frame based on the channels selected. The table on this screen gives you a summary of the PCM frame configuration to use for setting up your decom. The table gives you information about which demodulator channels have been included, the start word for each channel, the interval, commutation type (normal, sub-comm, super-comm), and the sample rate for each channel. Below the table is frame information including Frame Length, Words per Frame, Number of Minor Frames, Bit Rate, SFID Word, and the Sync Pattern. The PCM frame information can be printed as part of the Syrinx Configuration Report. Go to the Syrinx Demux Status Screen and select Print from the File drop down menu. Click the Print button to print the PCM Frame Configuration information.

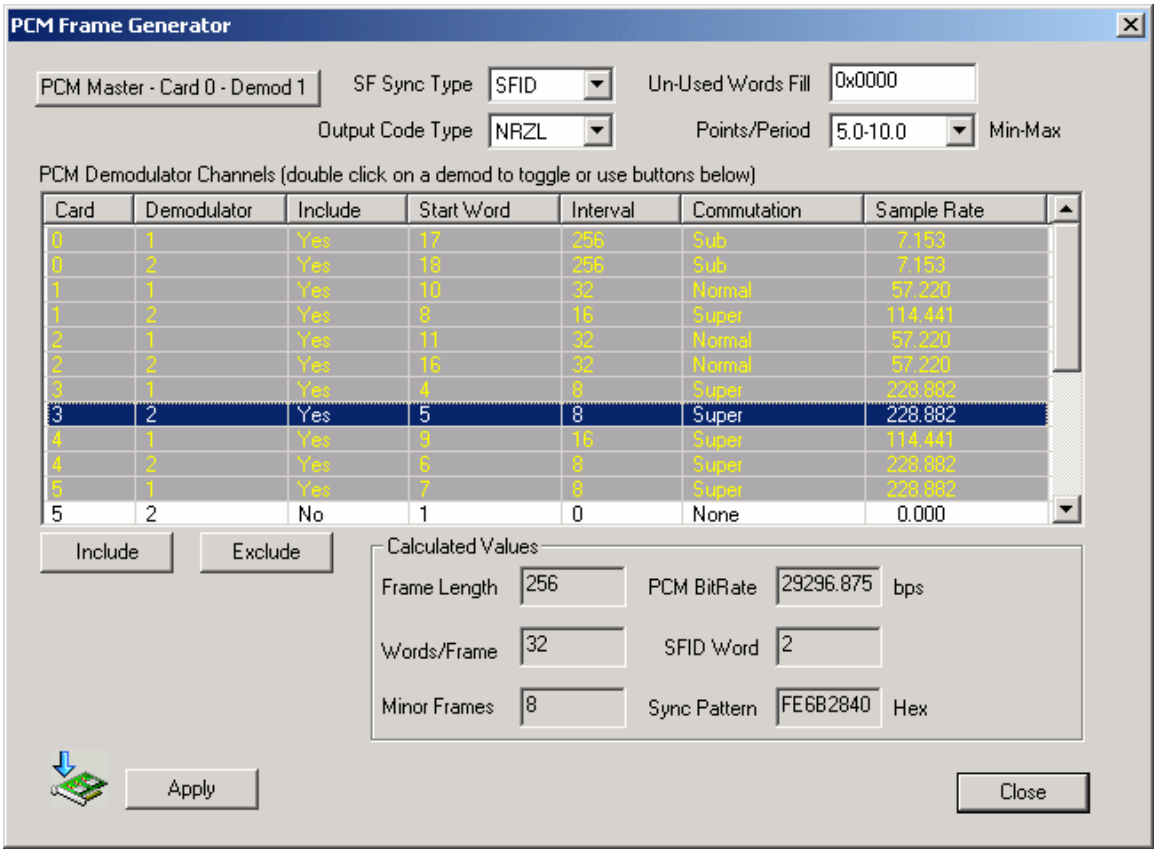


Figure 28 - PCM Frame Generator Screen

3.2 HalluxVME Calibrator Setup and Operation

The following sections describe the various screens of the optional HalluxVME sixteen channel Calibrator card. Sections 3.2.1 through 3.2.3 give information about the Calibrator Screen including the menu bar and channel setup instructions.

3.2.1 Calibrator Screen

The Calibrator Screen allows the user to setup the Calibrator parameters. This screen displays a Calibrator Setup Block along with optional toolbars. Software and DLL version numbers are displayed in the status bar at the bottom of the screen. Several drop down menu options are available and are discussed later in the manual.

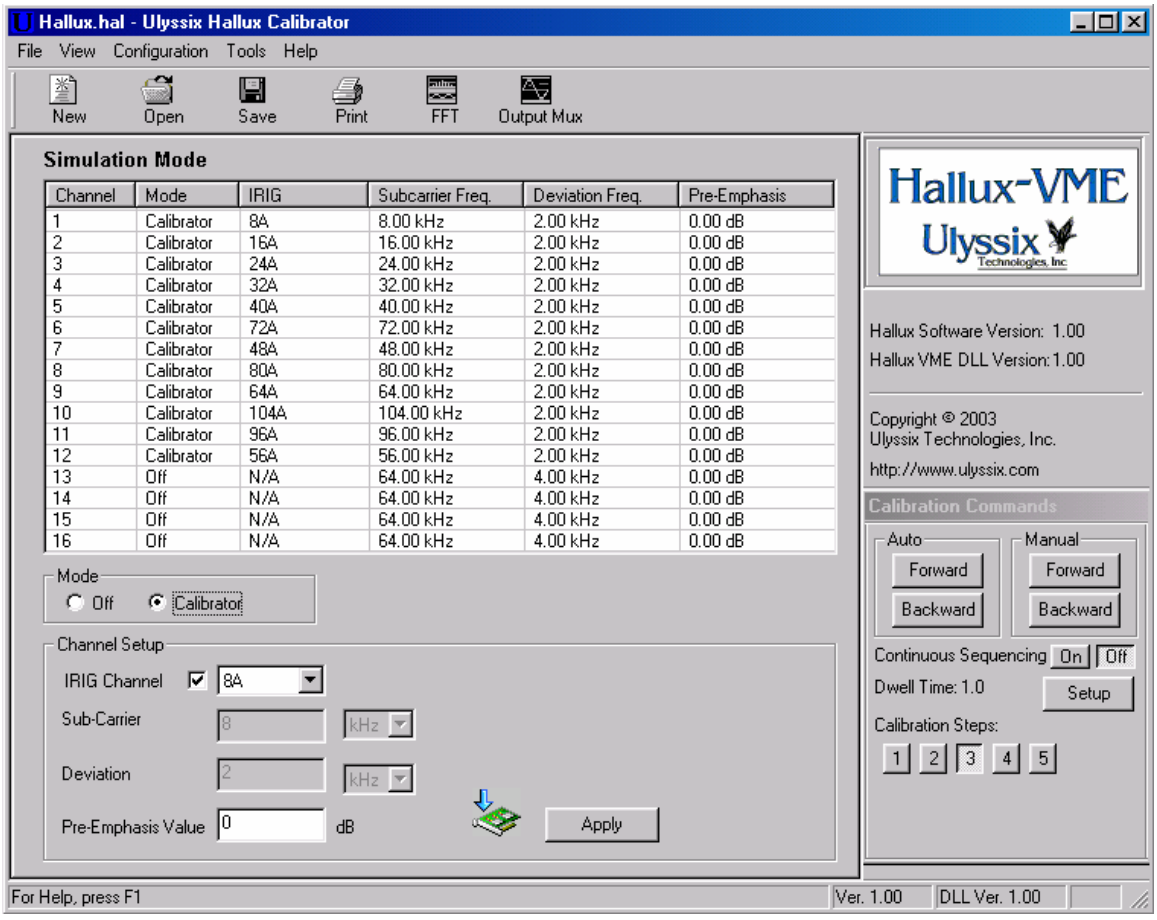


Figure 29 - Calibrator Screen

3.2.2 Calibrator Setup Block

The Calibrator Setup Block (See Figure 30) allows the user to program specific parameters for each of the sixteen channels on the Hallux-VME card. The various setup parameters are discussed below. Please note that you must click the Apply button to download any modified settings to the Hallux-VME card. No changes will be made until Apply has been clicked.

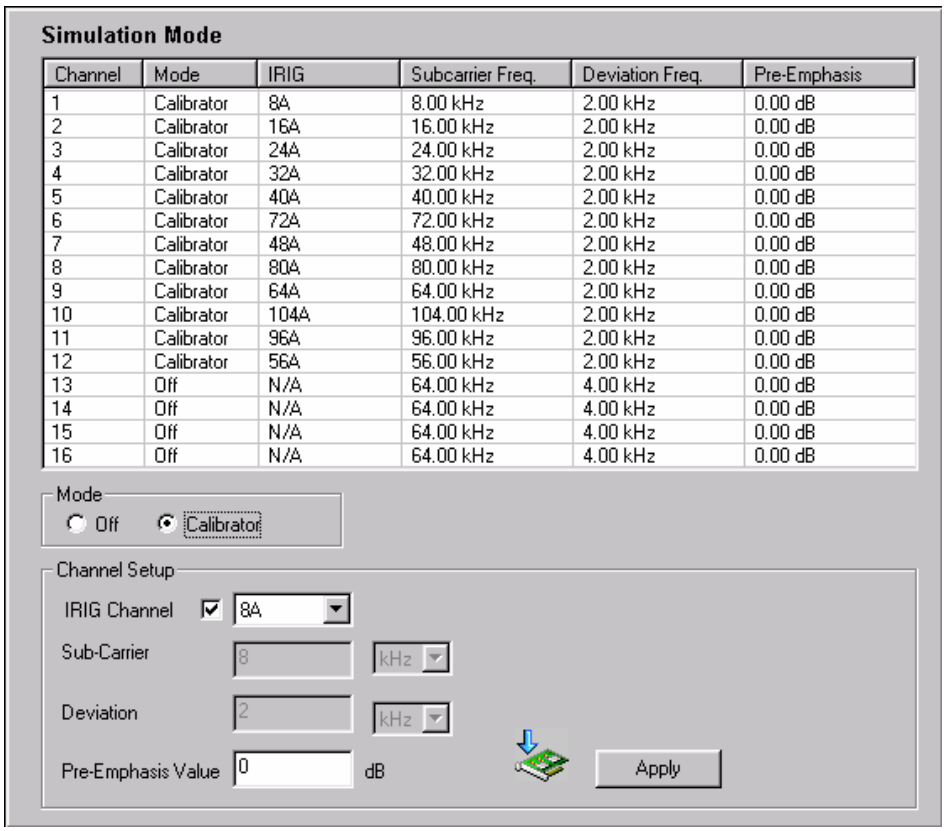


Figure 30 - Calibrator Setup Block

3.2.2.1 Channel Selection

To adjust the parameters the user must first select the desired channel. Select the desired channel by clicking the left mouse button while the cursor is placed on the specific channel row.

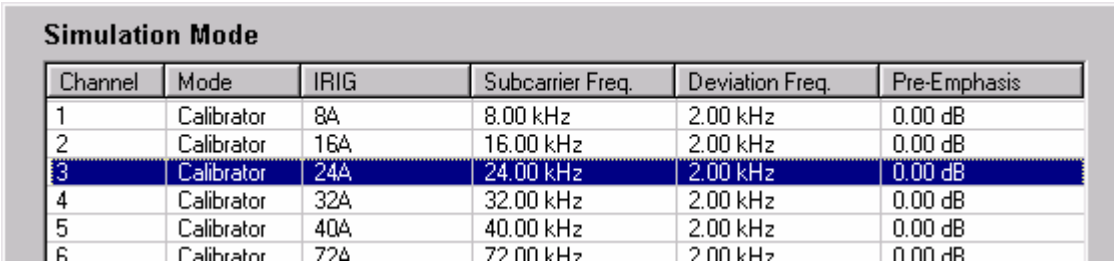


Figure 31 - Channel Selection

3.2.2.2 Channel Mode

Select the desired mode for the channel. Select Calibrator or OFF. Ulyssix recommends that you turn off any unnecessary channels.

3.2.2.2.1 Calibrator

Calibrator channels will automatically or manually step through a predefined profile for specific number of steps and dwell time. Access the calibrator toolbar from the View dropdown menu. See section 3.2.3.3.4 for calibrator setup information.

3.2.2.2.2 OFF

All unused channels should be turned off.

3.2.2.3 IRIG Channel

When a standard IRIG channel is desired, click the IRIG Channel box and select the appropriate IRIG channel from the drop down menu. The Sub-Carrier and Deviation will be automatically entered.

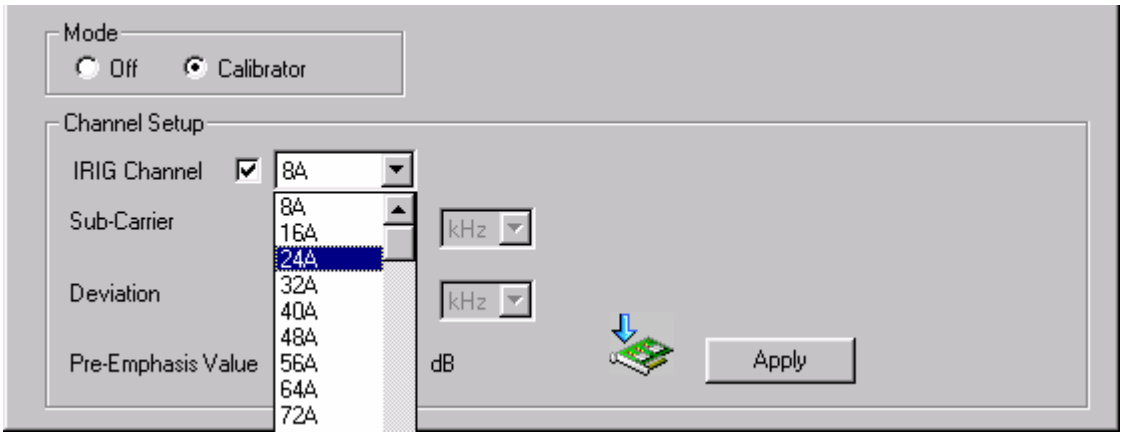


Figure 32 - IRIG Channel

3.2.2.4 Sub-Carrier

Enter the sub-carrier frequency of the desired channel. The Hallux-VME Calibrator supports IRIG and non-IRIG sub-carriers from 250 Hz to 5 MHz. Select the unit of measure from the drop down menu to the right of the Frequency. Select Hz, kHz, or MHz. The Frequency field is not accessible if you have selected an IRIG channel. It will, however, display the Frequency that corresponds to the selected IRIG channel.

3.2.2.5 Deviation

Enter the Deviation of the channel. The Hallux-VME card supports FM deviations from 0.5 to 50% of the entered center frequency. Select the unit of measure from the drop down menu to the right of the Frequency. Select Hz, kHz, or MHz. The Deviation field is not accessible if you have selected an IRIG channel. It will, however, display the Deviation that corresponds to the selected IRIG channel.

3.2.2.6 Pre-Emphasis

A Pre-Emphasis schedule can be applied to the output multiplex. This is done by entering a value from 0 dB to –20 dB for each channel. The amplitude of the channel will be reduced by the entered value. This value is a relative value between active sub-carriers.

3.2.3 Menu Bar Features

The menu bar provides access to configuration, status, and help screens, as well as control of standard Windows functions such as file management and printing. The specific use of these functions is explained below.

3.2.3.1 File

See Section 3.1.3.1

3.2.3.2 View

The View drop-down menu allows you to display or hide the main Toolbar, the Status Bar, or the Calibrator toolbar on the Calibrator Screen. It also displays the Card Selection Toolbar. The main Toolbar is the group of icons including New, Open, Save, Print, FFT, and Output Mux. The status bar is the bar of information displayed at the bottom of the screen that displays the software and dll version information. The Calibrator toolbar is explained in the next section of the manual. The Card Selection Toolbar is explained in Section 3.2.3.4.

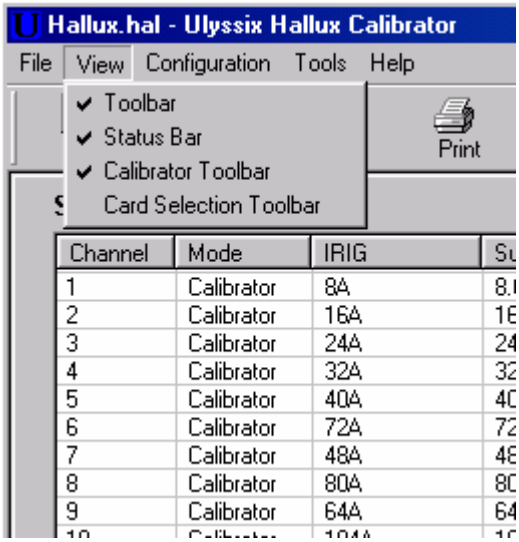


Figure 33 - View

3.2.3.3 Calibrator Toolbar

The Calibrator Toolbar (See Figure 34) allows you to control the calibrator function of the Hallux card. From this toolbar you select auto, manual, or continuous sequencing calibration, the number of calibration steps, and dwell time. The Calibrator Toolbar will only be automatically displayed if one or more Hallux channels are configured as calibrators.

3.2.3.3.1 Auto mode

For Automatic calibration, click either the Forward or Backward button located below the word Auto. If you select Forward, the calibrator will start at the programmed lower band edge and cycle upward to the programmed upper band edge, then return to the programmed center frequency. If you click the Backward button the direction of the calibration will be reversed.

3.2.3.3.2 Manual mode

For Manual calibration, click either the Forward or Backward button located below the word Manual. If you select Forward, the calibrator will step from the current position one step per click from lower band edge to upper band edge. If you click the Backward button the direction of the calibration will be reversed.

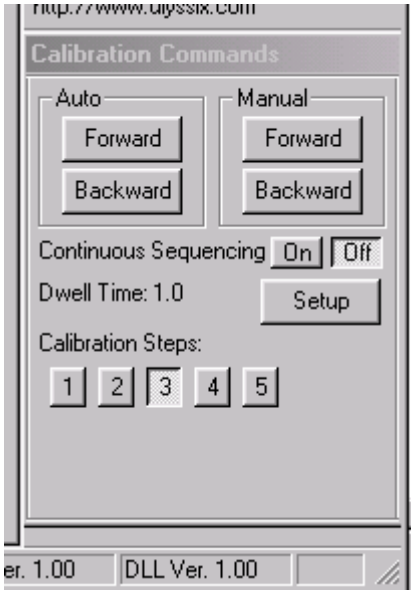


Figure 34 - Calibrator Toolbar

3.2.3.3.3 Continuous Sequencing

Continuous Sequencing allows you to repeat the calibration sequence through the programmed number of calibration steps indefinitely in the forward direction. All channels configured as calibrator channels will begin at lower band edge and sequence forward to upper band edge. The calibrator will then return to lower band edge and continue to sequence. When Continuous Sequencing is selected, the Auto and Manual calibration control buttons will be disabled. Click the Continuous Sequencing -Off button to stop the cycle.

3.2.3.3.4 Calibrate Setup

Click the Setup button to set the number of steps and the dwell time. Enter the desired number of calibration steps from 3 to 21. The dwell time can be from 0.1 to 10 seconds. To set the dwell time, click and drag the slide button until the desired number of seconds is displayed. You can also click to the left or right of the button to change the setting in half-second steps.

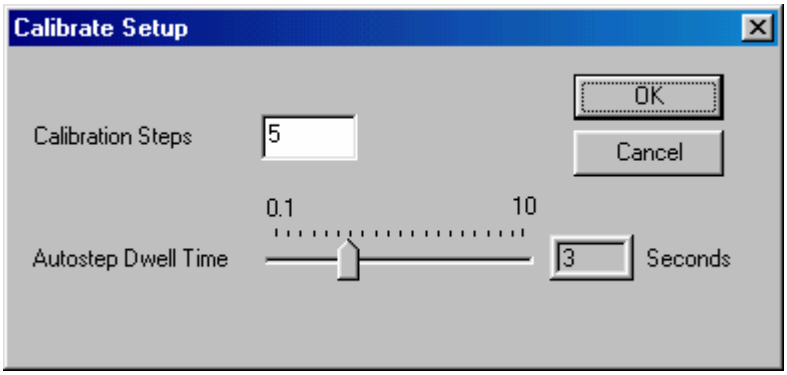


Figure 35 - Calibrate Setup Screen

3.2.3.4 Card Selection Toolbar

The Syrinx Demux system can only handle one Hallux-VME card so this feature is not used.

3.2.3.5 Configuration

The Configuration drop-down menu allows you to set the multiplex output configuration.

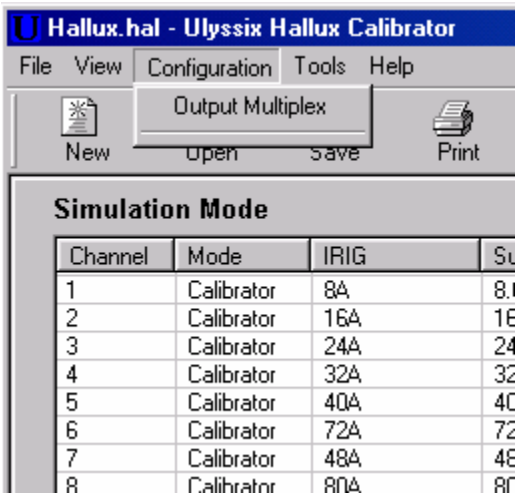


Figure 36 - Configuration Drop Down Menu

3.2.3.5.1 Output Multiplex

Select Output Multiplex from the Configuration menu to set the voltage level and offset for the output of the card. Click and drag the slide button to set the desired value. You can also click to the left or right of the button to change the value in 1V steps for Output Level and 0.5V steps for Output Offset. The programmed peak-to-peak output voltage is measured at the output connector if one channel is configured. As you add channels the voltage level may reduce. Click the Apply button to download your settings.

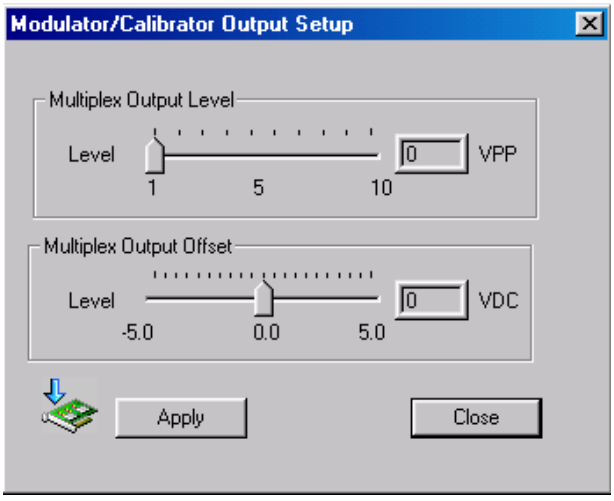


Figure 37 - Output Multiplex Screen

3.2.3.6 Tools

The Tools dropdown menu allows you to open the Hallux-VME software debug screen and access the Multiplex FFT screen.

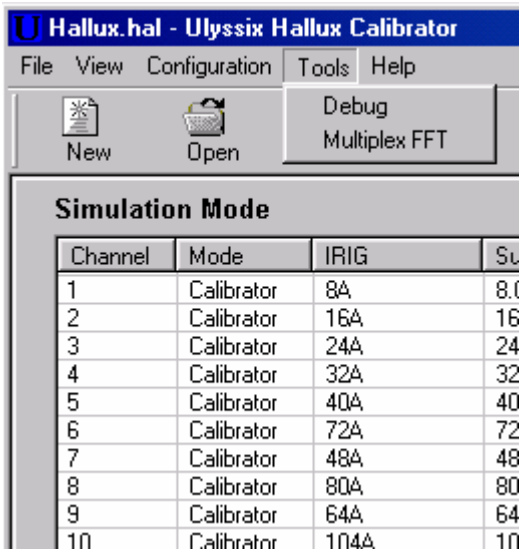


Figure 38 - Tools

3.2.3.6.1 Debug Screen

The debug screen is used at the factory to access the registers of the Hallux-VME board. Typically a user will not access the debug screen. In some instances, however, there may be a need to open the debug screen for troubleshooting purposes. Ulyssix recommends that you not attempt to use the debug screen without consulting the factory.

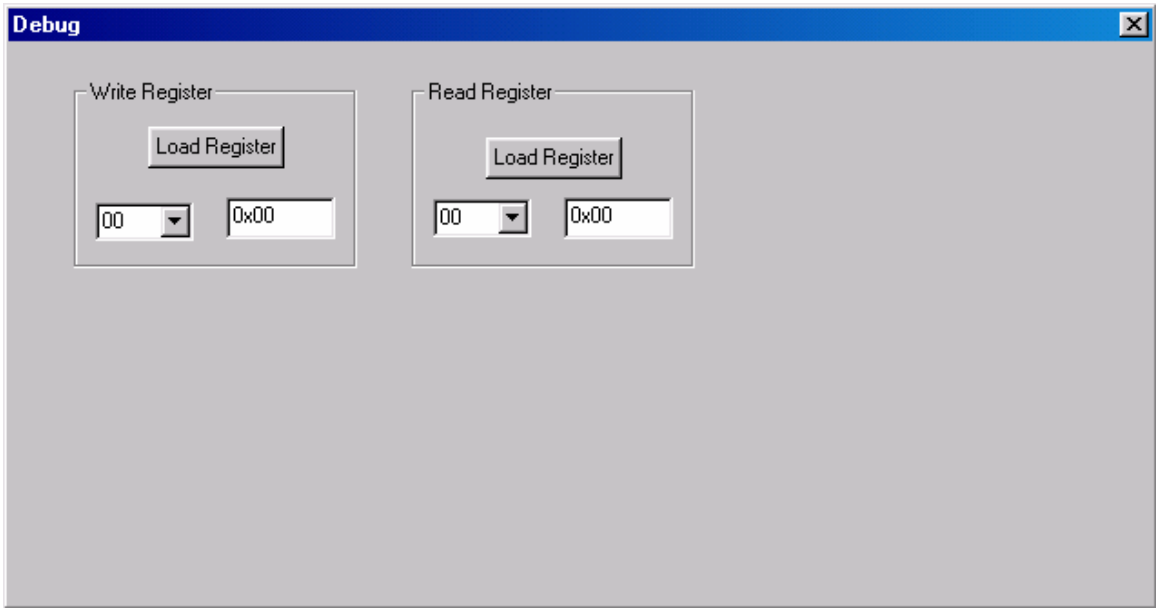


Figure 39 - Debug Screen

3.2.3.6.2 Multiplex FFT Screen

The Multiplex FFT Screen gives a graphical representation in the frequency and time domain of the programmed output multiplex. The X-axis of the FFT screen is scaled to 5 MHz, the max output frequency of the card. The resolution of the X-Axis for the Frequency Domain display is the total display range (5MHz) divided by 512 (512 point FFT) or 9.765 kHz. The screen allows you to view the frequency content and any pre-emphasis schedule that you may have applied. Several fields allow you to change the display.

3.2.3.6.2.1 FFT Window

Select from Hamming, Hanning, Blackman, or Rectangular FFT windowing of the Frequency Domain window.

3.2.3.6.2.2 Frequency Domain Controls

Set the Min and Max dB point for the Frequency Domain display. This feature allows you to "zoom in" on a very specific dB range of the output multiplex. This allows you to confirm that the programmed subcarriers are present and that the proper pre-emphasis has been applied. The X-axis of the FFT screen is scaled to 5 MHz, the max output frequency of the card. The resolution of the X-Axis of the Frequency Domain display is the total display range (5MHz) divided by 512 (512 point FFT) or 9.765 kHz.

3.2.3.6.2.3 Time Domain Controls

Set the Min and Max levels for the Time Domain display. This is the "amplitude" setting for the Time Domain display. The unit of measure for the time domain is percent deviation of the programmed output level.

3.2.3.6.2.4 FIFO Controls

The FIFO controls allow you to pause and single step the display data.

3.2.3.6.2.5 Grid Controls

Select Grid at the bottom right corner of each display section to display the grid. Deselect Grid to turn the grid off.

3.2.3.6.2.6 Y Min Top Control

Select Y Min Top at the bottom right corner of each display if you want to make the top of the screen the min point.

3.2.3.6.2.7 Print

Select the print button to generate a report and send it to an installed printer.

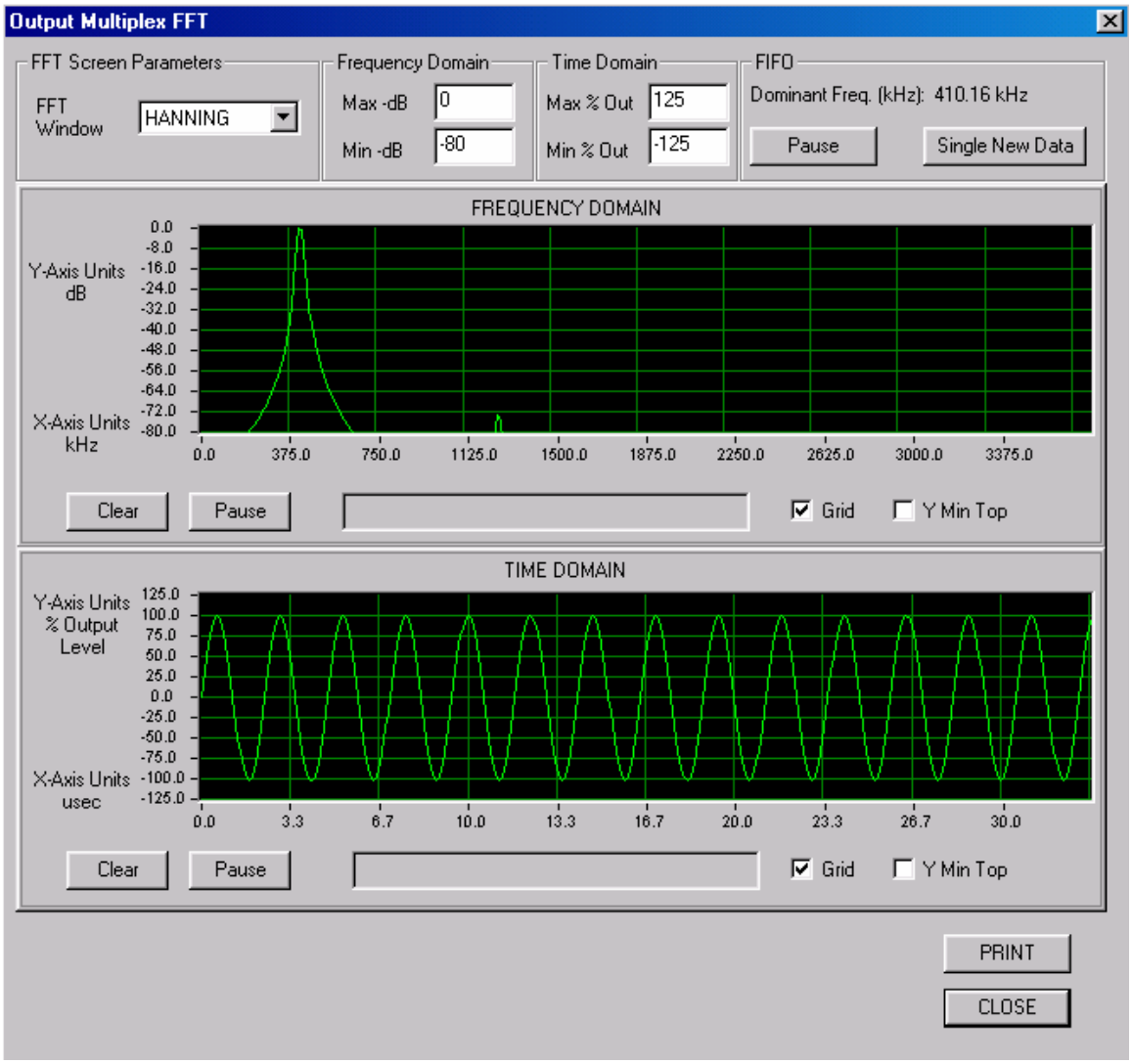


Figure 40 - FFT Screen

3.2.3.6.2.8 FFT Marker

To use the FFT Marker, move your mouse to a point of interest and click the left mouse button. A yellow marker appears. The Frequency and amplitude for that point of interest will be displayed at the bottom of the screen. For the Frequency Domain display, the X data is the Frequency in kHz. The Y data is the amplitude in dB. The resolution of the X-Axis of the Frequency Domain display is the total display range (5MHz) divided by 512 (512 point FFT) or 9.765 kHz. For the Time Domain display, the X data is time in microseconds. The Y data is the amplitude in percent of the programmed output level.

3.2.3.7 Help

Select “Manual” from the Help drop down menu to view the User Manual. Adobe Acrobat Reader version 4.0 or above is required to view the manual. Select “About” from this drop down menu to view the Software version and release date.