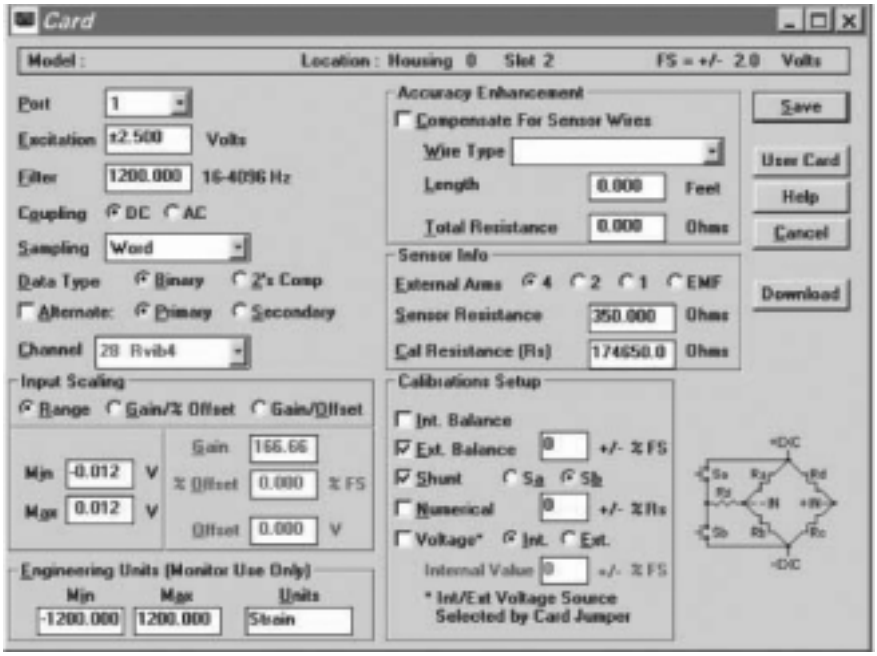
770-010x, 770-011x, 770-020x, 770-021x, 770-030x and 770-031x Universal Bridge Signal Conditioners



Universal Bridge signal conditioners are designed to interface to 1, 2, or 4 external arm resistive bridges, potentiometers, or other transducers that require a voltage excitation source and provide a voltage output to be amplified, presample filtered, or digitized prior to insertion into the PCM stream.

Universal Bridge signal conditioners are available with 2, 4, or 8 independently programmable signal conditioning channels for measuring position, pressure, strain, vibration and voltage using bridge, EMF, piezoelectric and other sensors providing voltage outputs.

HIGHLIGHTS

- Set gain, offset, filtering, AC/DC coupling, excitation, bridge completion, and calibration from one easy to use set-up screen
- Gain is continuously programmable from 1 to 1000
- Programmable input scaling by input voltage range, gain and offset, or gain and percent offset
- Butterworth, continuous time state variable, presampling filter with cutoff frequency defined at the –0.5 dB point
- Filters are programmable over an eight octave frequency range with programming resolution of 4000 steps
- Cards are available in two input voltage ranges and three presample filter frequency ranges
- Programmable 2-arm or 4-arm external bridge completion measurements with shunt calibration and autobalance capability

Dual and Quad signal conditioners have one analog to digital converter (ADC) per channel. This enables input data from each channel to be individually sampled by word, minor frame, or major frame at a rate of up to 40000 samples per second, per port.

Dual and Quad signal conditioners are available in three presample filter frequency ranges for input voltage spans of 4 mV to 4V or 10mV to 10V.

Octal signal conditioners have one multiplexed ADC. All eight channels are combined to produce a single digital output. Data sampling is performed on the multiplexed output at a rate of 40000 samples per second.

Octal signal conditioners are available in three presample filter frequency ranges for input voltage spans of 4 mV to 4V or 10mV to 10V.

Card Configuration

2, 4, or 8 independently programmable signal conditioning channels for bridge, EMF, piezoelectric, and other sensors with voltage outputs. Each channel has programmable gain, offset, filtering, calibration, excitation voltage, and completion resistors for 1, 2, and 4 arm bridges

Plug-ln Cards

Dual Cards	Presample		Programmable
Part No.	**Filter**	**Order**	**Input Voltage Span**
770-0100	4 to 1024 Hz	8th	4 mV to 4V bipolar or unipolar
770-0110	4 to 1024 Hz	8th	10mV to10V bipolar or unipolar
770-0101	8 to 2048 Hz	8th	4mV to 4V bipolar or unipolar
770-0111	8 to 2048 Hz	8th	10mV to 10V bipolar or unipolar
770-0102	16 to 4096 Hz	8th	4mV to 4V bipolar or unipolar
770-0112	16 to 4096 Hz	8th	10mV to 10V bipolar or unipolar

Quad Cards	Presample		Programmable
Part No.	**Filter**	**Order**	**Input Voltage Span**
770-0200	4 to 1024 Hz	6th	4 mV to 4V bipolar or unipolar
770-0210	4 to 1024 Hz	6th	10mV to10V bipolar or unipolar
770-0201	8 to 2048 Hz	6th	4mV to 4V bipolar or unipolar
770-0211	8 to 2048 Hz	6th	10mV to 10V bipolar or unipolar
770-0202	16 to 4096 Hz	6th	4mV to 4V bipolar or unipolar
770-0212	16 to 4096 Hz	6th	10mV to 10V bipolar or unipolar

Octal Cards	Presample		Programmable
Part No.	**Filter**	**Order**	**Input Voltage Span**
770-0300	4 to 1024 Hz	4th	4 mV to 4V bipolar or unipolar
770-0310	4 to 1024 Hz	4th	10mV to10V bipolar or unipolar
770-0301	8 to 2048 Hz	4th	4mV to 4V bipolar or unipolar
770-0311	8 to 2048 Hz	4th	10mV to 10V bipolar or unipolar
770-0302	16 to 4096 Hz	4th	4mV to 4V bipolar or unipolar
770-0312	16 to 4096 Hz	4th	10mV to 10V bipolar or unipolar

Input Voltage Resolution

Part No.	**Input Voltage Resolution**
770-0x0x	10 µ V for input spans of 4 to 40 mV
	100 µ V for input spans of 40 to 400 mV
	1mV for input spans of 0.4 to 4 V
770-0x1x	25 µ V for input spans of 10 to 100 mV
	250 µ V for input spans of 0.1 to 1 V
	2.5mV for input spans of 1 to 10V

Input Voltage Inaccuracy

0.15% maximum of programmed value at 25°C

Input Voltage Temperature Coefficient

Daul, Quad, and 770-030x cards: 0.0035% per°C maximum

770-031x cards: 0.006% per°C maximum

Input Sampling Rate

Dual and Quad cards: 40 kilosamples per second maximum per port, based on minimum time interval between samples

Octal cards: 40 kilosamples per second maximum per card, based on minimum time interval between samples

Presample Filter Frequency

Programmable over 256 to 1 frequency range with resolution of 4000 steps over the specified frequency range

Presample Filter Response

8th , 6th or 4th order Butterworth, continuous time state variable, with cutoff frequency defined at the –0.5 dB point

Programmable Excitation Voltage Range

Dual and Quad cards: ±1.0 to ±5.0V, bipolar

Octal cards: ±1.0 to ±5.0V, bipolar, all channels share excitation

Programmable Excitation Voltage Resolution

2.5 mV

Excitation Voltage Inaccuracy

5mV maximum, over full operating temperature range with 20 mA load

Excitation Current

240 mA maximum, per card, with short-circuit, overload protection

Input Common Mode Voltage

Dual and Quad cards: ±10V maximum, for specified CMRR

Octal cards: ±3V maximum, for specified CMRR

Maximum Safe Input Voltage

±35V, AC or DC, either input to ground

Common Mode Rejection Ratio

With 100 ohm bridge:

120 dB minimum for input spans of 4 to 40 mV and 10 to 100mV

106 dB minimum for input spans of 40 to 400 mV and 100mV to 1V

90 dB minimum for input spans of 0.4 to 4V and 1 to 10V

With EMF inputs and 100 ohm unbalance:

90 dB minimum for input spans of 4 to 40 mV and 10 to 100mV

76 dB minimum for input spans of 40 to 400 mV and 100mV to 1 V

60 dB minimum for input spans of 0.4 to 40 V and 1 to 10 V

Differential Input Resistance

10 MΩ minimum

Common Mode Input Resistance

2.5 MΩ minimum

Offset Range

Dual and Quad cards: Bipolar, ±75% of span, referred to input

Octal cards: Bipolar, ±50% of span, referred to input

Offset Resolution

0.05% of span

Offset Inaccuracy

0.05% of span maximum

Interanl Balance

Eliminates internal electronic offsets, each channel autobalances to midscale (0.0 volt) with amplifier inputs terminated to internal systme ground through 1000 ohms. Then the user programmed offset value is added to obtain the required output.

Exteranl Balance

Each channel autobalances with the sensor connected setting the output to the user

programmed percent of full scale (%FS).

Autobalance Range

Dual and Quad cards: Bipolar, ±75% of span, referred to input

Octal cards: Bipolar, ±50% of span, referred to input

Autobalance Resolution

0.05% of span

Autobalance Inaccuracy

0.05% of span

AC/DC Coupling

Programmable (Dual Card only)

AC Coupling Cutoff Frequency

0.1 Hz maximum (Dual Card only)

Output Offset With AC Coupling

Less than 1 LSB for 12 bits (Dual Card only)

Shunt Calibration

Programmable shunt of user installed calibration resistor in each channel from bridge center to either plus or minus excitation voltage

Numerical Calibration

Numerical Calibration is similar to shunt calibration, but uses a digital to analog converter (DAC) and user installed calibration resistor to simulate a programmable shunt resistance.

Voltage Calibration

Internal or external voltage source selectable by jumper (zero ohm resistor) installed on card. Factory default is internal source

Internal Voltage Source

Programmable from –5 to +5V with 1.25mV resolution and 5mV maximum inaccuracy over full operating temperature range

External Voltage Source

Single ended input connected to power connector on housing

Bridge Configurations

All cards: Programmable for 4 arm or 2 arm bridge.

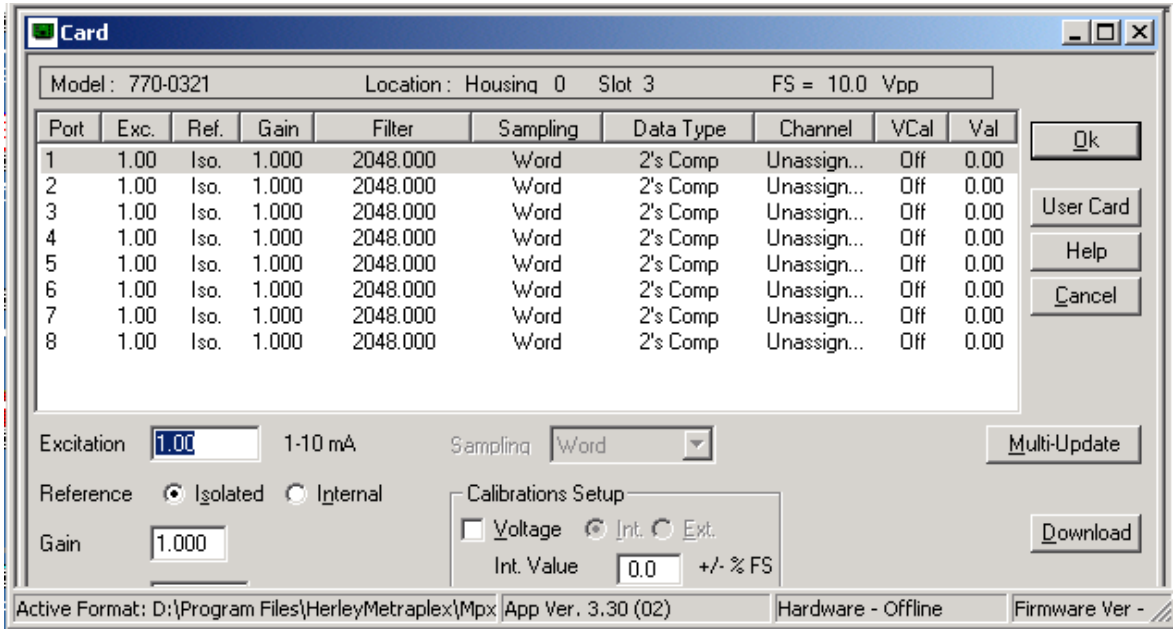
Dual and Quad cards: For 1 arm bridge, a jumper is replaced by the user installed bridge completion resistor

Analog Monitor Output

±1V from 1000 ohm source (Dual Card only)

Note: Specifications subject to change without notice.

770-012x, 770-022x, and 770-032x Constant Current Piezoelectric Singal Conditioners



Constant Current Piezoelectric signal conditioner plug-in cards are available with two, four, and eight independently signal conditioned input channels.These cards are designed to interface with charge conditioned piezoelectric accelerometers and force gages that require a constant current excitation to provide a voltage output at the DC bias voltage point. Other types of gages that require AC coupling and constant current excitation can also be accommodated.

HIGHLIGHTS

- Constant current supplies with short-circuit and overload protection
- Compliance voltage circuitry utilizes the high voltage power source input and return located on the input power connector to each housing
- Cards can be operated with the gage floated or connected to ground
- Butterworth, continuous time state variable, presampling filter with cutoff frequency defined at the –0.5 dB point
- Filters are programmable over and eight octave frequency range with programming resolution of 4000 steps
- Cards are available in two excitation current ranges

Dual and Quad signal conditioners have one analog to digital converter (ADC) per channel. This enables input data from each channel to be individually sampled by word, minor frame, or major frame at a rate of up to 40000 samples per second, per port.
Dual and Quad signal conditioners are available in three presample filter frequency ranges.

Octal signal conditioner have one multiplexed ADC. All eight channels are multiplexed to produce

a single digital output. Data sampling is performed on the multiplexed output at a rate of 40000 samples per second.
Octal cards are available in two excitation current ranges and three presample filter frequency ranges.

Card Configuration

2, 4 or 8 independently signal conditioned channels for constant current piezoelectric sensors

Plug-In Crads

Dual Cards Part No.	Presample Filter	Order	Programmable Excitation Range
770-0120	4 to 1024 Hz	8th	1 to 10 mA in 2.5 μA steps
770-0121	8 to 2048 Hz	8th	1 to 10 mA in 2.5 μA steps
770-0122	16 to 4096 Hz	8th	1 to 10 mA in 2.5 μA steps

Quad Cards Part No.	Presample Filter	Order	Programmable Excitation Range
770-0220	4 to 1024 Hz	6th	1 to 10 mA in 2.5 μA steps
770-0221	8 to 2048 Hz	6th	1 to 10 mA in 2.5 μA steps
770-0222	16 to 4096 Hz	6th	1 to 10 mA in 2.5 μA steps

Octal Cards Part No.	Presample Filter	Order	Programmable Excitation Range
770-0320	4 to 1024 Hz	4th	1 to 10mA in 2.5 μA steps
770-0328	4 to 1024 Hz	4th	0.5 to 5mA in 1.25 μA steps
770-0321	8 to 2048 Hz	4th	1 to 10mA in 2.5 μA steps
770-0329	8 to 2048 Hz	4th	0.5 to 5mA in 1.25 μA steps
770-0322	16 to 4096 Hz	4th	1 to 10mA in 2.5 μA steps
770-032A	16 to 4096 Hz	4th	0.5 to 5mA in 1.25 μA steps

Excitation Current Inaccuracy

0.5% maximum

External Compliance Voltage Source

+24 to +32V, applied to CMV SRC pin on housing power connector

Compliance Voltage

+18 V to 21V

Current Source Impedance

50 kΩ minimum in parallel with 20 pF maximum, for 1 mA load

AC Input Voltage Span

770-012x, 770-022x, 770-0320, 770-0321, 770-0322: Programmable from 10 mV to 10 Vpp in 2.5 mV steps

770-0328, 770-0329, 770-032A: Programmable from 5 mV to 5 Vpp in 1.25 mV steps

AC Input Voltage Inaccuracy

0.15% maximum of programmed value at 25°C

Input Voltage Temperature Coefficient

0.0035% per°C

Input Sampling Rate

Dual and Quad cards: 40 kilosamples per second maximum per port, based on minimum time interval between samples

Octal Cards: 40 kilosamples per second maximum per card, based on minimum time interval between samples

Presample Filter Frequency

Programmable over the specified frequency range with resolution of 4000 steps

Presample Filter Response

4th, 6th, or 8th order, Butterworth, continuous time state variable ,with cutoff frequency

defined at the –0.5dB point

AC Coupling Cutoff Frequency

2 Hz maximum at –3 dB point

Output Offset Voltage Error

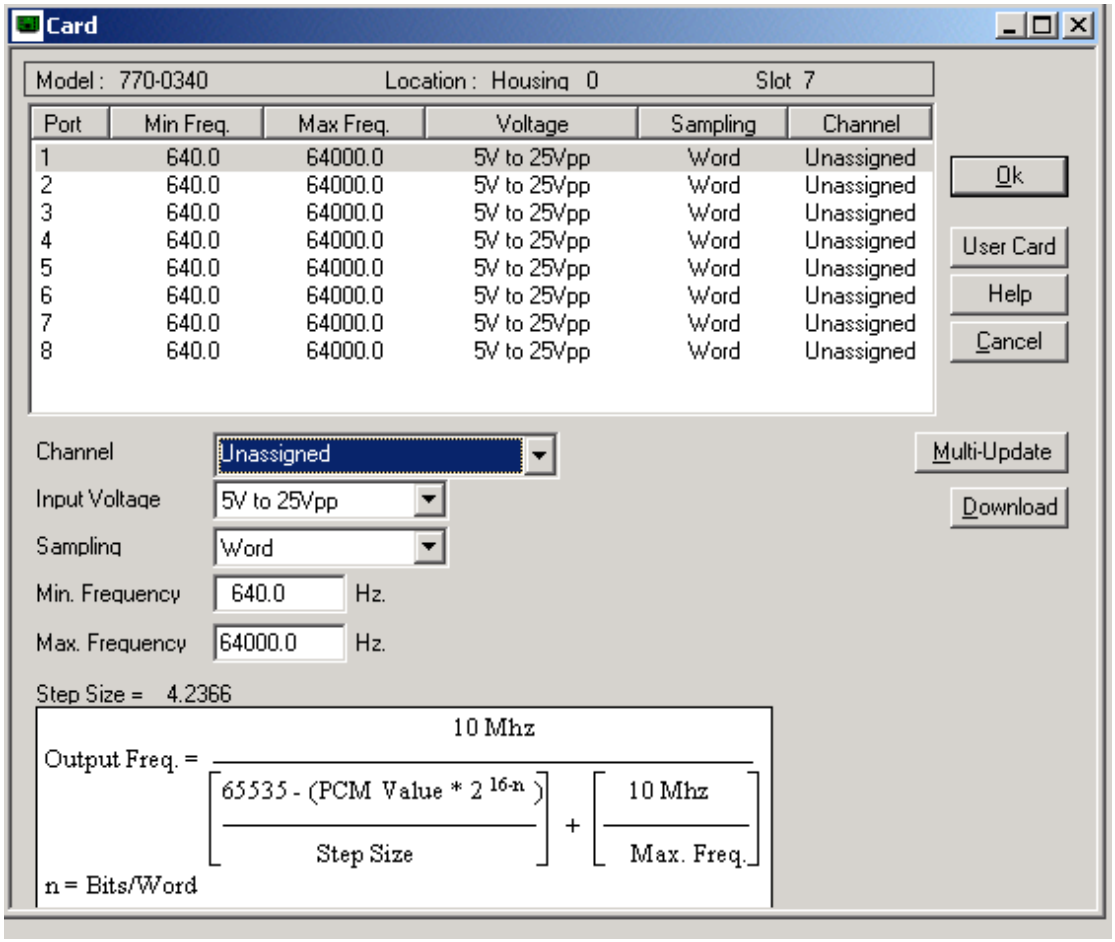
Less than 1 LSB for 12-bit digitizing

Analog Monitor Output

±1V from 1000 ohm source (Dual Card only)

Note: Specifications subject to change without notice.

770-0140, 770-0240 and 770-0340 Tachometric Signal Conditioners



Tachometric signal conditioners are available with two, four and eight independently signal conditioned input channels.
Tachometric cards are designed to provide a high resolution solution for measuring the frequency of waveforms and pulse inputs from tachometers and flow meters. These cards provide independent AC coupled channels with differential input configuration.
The zero crossing points of the input signal are sampled using an extremely high frequency clock and averaged over multiple cycles of the waveform. The output is then normalized to the user programmable input frequency range.

HIGHLIGHTS

- Independent channels for tachometric signals from 4 mV to 25V peak to peak
- Programmable maximum full scale frequency range from 1 Hz to 100kHz
- Samples are averaged to provide stable measurements
- Built-in hysteresis to minimize false zero detection

Card Configuration

2, 4, or 8 independently signal conditioned channels for tachometric sensors

Plug-in Cards

Part No.	Channels
770-0410	2
770-0240	4
770-0340	8

AC Input Voltage Span

4 mVpp to 25 Vpp

Maximum Safe Input Voltage

±35V AC or DC

Input Waveform Type

Sine, triangular, square or pulse

AC Coupling Cutoff Frequency

0.3 Hz maximum

Minimum Input Pulse Width

3.0 μs

Minimum Input Pulse Duty Cycle

50% at 4 mVpp

10% at 20 mVpp

1% at 200 mVpp

Input Configuration

Differential

Differential Input Resistance

100 kΩ minimum for all conditions

Common Mode Input Resistance

25 kΩ minimum

Frequency Measurement Range

1 Hz to 100 kHz full scale, maximum frequency programmable from 100 Hz to 64 kHz

Frequency Measurement Resolution

100 nsec update of the calculated step size

Sample Averager

4 zero crossing of the input waveform

PCM Output Data Frequency Conversion

The PCM output can be converted to frequency using the following equation:

$$PCMOutputFrequency = \frac{10MHz}{\frac{65{,}535 - \left[PCMOutput \times 2^{16-n}\right]}{StepSize} + \frac{10MHz}{MaxFreq}}$$

$$StepSize = \frac{65{,}536}{10^7 - \left(\frac{1}{MinFreq} - \frac{1}{MaxFreq}\right)}$$

n = number of bits/word

Min Freq = enter minimum frequency range value

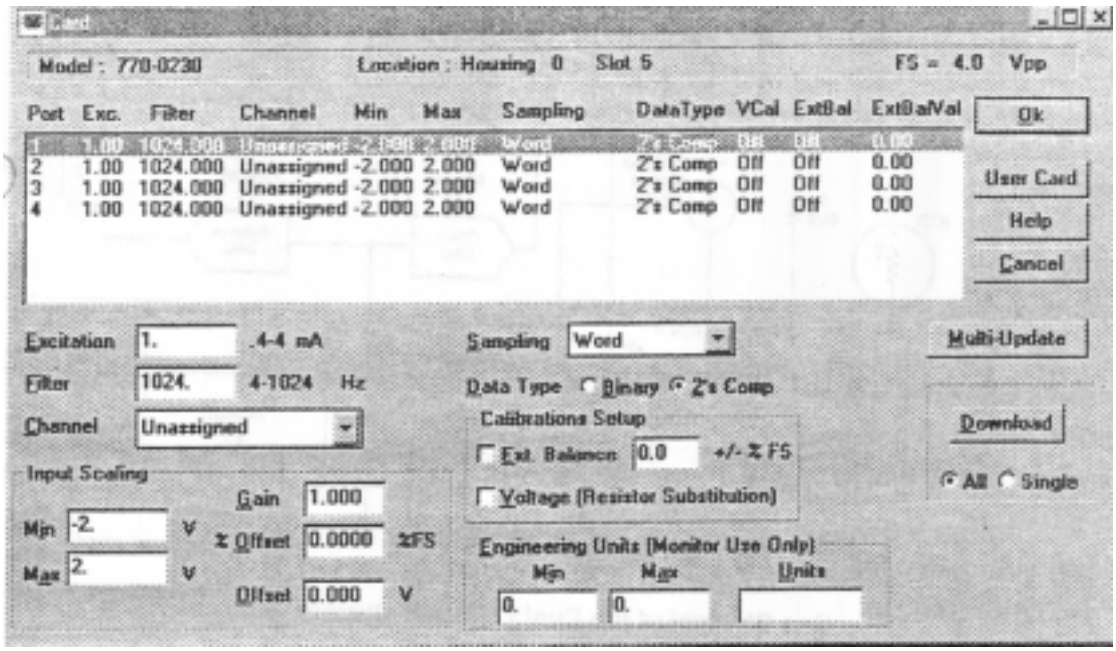
Max Freq = enter maximum frequency ragne value

Digital Frequency Representation

Binary 12 bit resolution

Note: Specificationssubject to change without notice.

770-013x, 770-023x and 770-033x Constant Current Platinum RTD Signal Conditioners



Constant Current platinum resistance temperature device (RTD) signal conditioners are available with two, four, and eight independently signal conditioned input channels.
These cards are designed to provide the precision and stability needed for high accuracy platinum RTD temperature measurements form -200℃ to +800℃. They can also be used with other types of RTDs with resistance coefficients from 0.2% to 0.8% per ℃.
Dual and Quad signal conditioners have one analog to digital converter (ADC) per channel which allows sampling of the input data by word, minor frame, or major frame.
Octal signal conditioners have one multiplexed ADC. All eight channels are multiplexed to produce a single digital output. Data sampling is performed on the multiplexed output at a rate of 40000 samples per second.
Dual, Quad and Octal cards use 8th, 6th, and 4th order Butterworth presample filters respectively. Dual and Quad cards support RTDs with 2, 3, and 4 wire configurations. Octal cards support 2 wire configurations.

HIGHLIGHTS

- Programmable constant current supplies with short-circuit and overload protection
- One ADC per channel on Dual and Quad cards
- Butterworth, non-sampled state variable, presampling filters with cutoff frequency defined at the –0.5 dB point
- Filters are programmable over an eight octave frequency range with resolution of 4000 steps
- Dual signal conditioners provide analog monitor outputs on the housing front cover for monitoring the conditioned and filtered signal, prior to being digitized

Card Configuration

2, 4, or 8 independently signal conditioned channels for constant current platinum RTD sensors

Plug-In Cards

Dual Cards

Part No.	Presamlpe Filter	order
770-0130	4 to 1024 Hz	8th
770-0131	8 to 2048 Hz	8th
770-0132	16 to 4096 Hz	8th

Quad Cards

Part No.	Presamlpe Filter	order
770-0230	4 to 1024 Hz	6th
770-0231	8 to 2048 Hz	6th
770-0232	16 to 4096 Hz	6th

Octal Cards

Part No.	Presamlpe Filter	order
770-0330	4 to 1024 Hz	4th
770-0331	8 to 2048 Hz	4th
770-0332	16 to 4096 Hz	4th

RTD Center Scale Range

25 ohms to 2000 ohms

RTD Delta R Range

20 ohms to 2000 ohms

Sensor Input Resistance

10^{10} ohms, minimum

Excitation Source Resistance

2.5MΩ, minimum

Excitation Current Range

Programmable from 0.4 mA to 4 mA in 3600 steps of 1 μA

Excitation Current Inaccuracy

±0.15% maximum of programmed value

Voltage Compliance

±4V

Voltage Gain

Programmable form 5.12 to 51.2 in 3600 steps of 0.0128

Voltage Gain Inaccuracy

±0.15% of span maximum

Offset Voltage

Programmable from –0.5 to –4.0V in 3500 steps of 1 mV

Offset Inaccuracy

±0.15% of span maximum

Autobalance Range

Bipolar, ±50% of span maximum

Autobalance Resolution

0.012% of span

Autobalance Inaccuracy

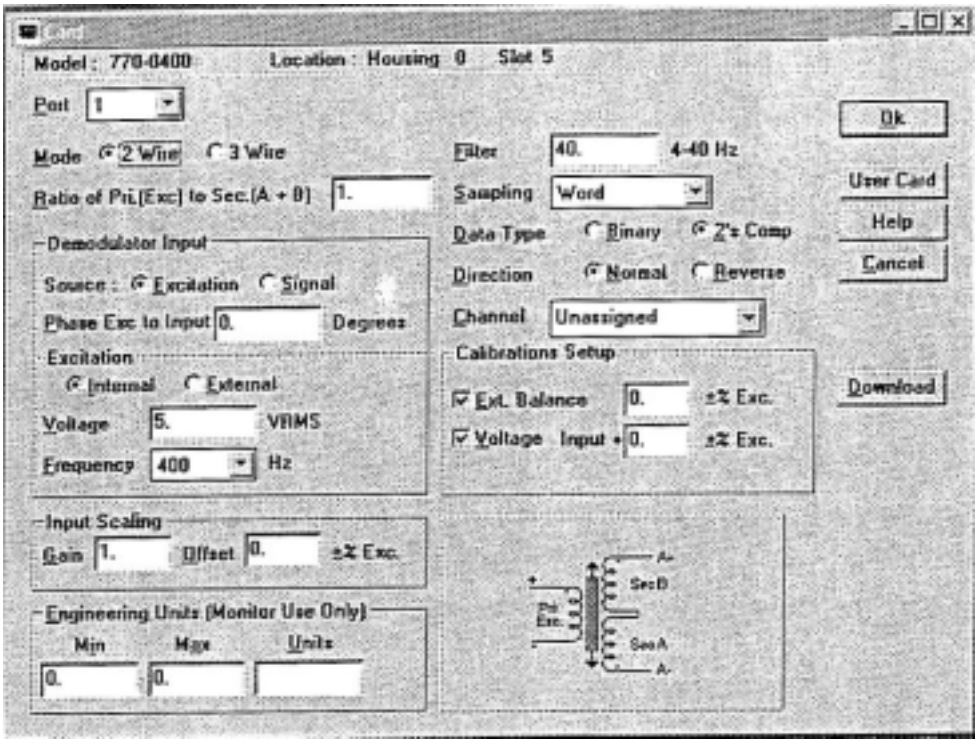
0.05% of span

Analog Monitor Output

±1V form 1000 ohm source (Dual Card only)

Note: Specifications subject to change without notice.

770-0400 Dual LVDT/RVDT Signal Conditioner



Dual linear variable differential transformer (LVDT) and rotary variable differential transformer (RVDT) signal conditioner cards are designed to interface to 2 and 3 wire configurations. The card generates the necessary AC excitation signal to drive the transducer primary and then converts the transducer mechanical position to a digital output. After scaling the transformer input voltages, the signals are demodulated and converted to a ratiometric signal that is proportional to the ratio of the two transformer voltages. Ratiometric conversion eliminates errors due to drift in the primart AC excitation signal. The resulting position output is filtered and digitized prior to insertion in the PCM stream.

Cards use 4th order Butterworth presampling filters, Each card has two identical circuits for independent transdrcer measurements and two independent analog to digital converters (ADCs). Independent ADCs allow sampling of the input data by word, minor frame, or major frame.

HIGHLIGHTS

- Two fully independent channels with programmable gains and offsets
- Excitation is selectable for internal or external
- 4th order Butterworth, non-sampled state variable, filter with cutoff frequency defined at the –0.5 dB point
- Program selectable 2 or 3 wire input configurations
- Menu driven software aids the user in connecting the card to the transducer
- Two independent ADCs allow sampling of the input data by word, minor frame, or major frame

Card Configuration

2 independently signal conditioned channels for LVDT or RVDT inputs

Input Configuration

2 or 3 wires, program selectable

Maximum Safe Input Voltage

±80V, AC or DC, any input to ground

Input Voltage Range

0.3Vrms to 10 Vrms

Input Voltage Inaccuracy

2 wire—0.1% after calibration of transducer

3 wire—0.25% after calibration of transducer

Input Voltage Temperature Coefficient

0.0035% per℃ maximum

Input Sampling Rate

40 kilosamples per second maximum per port

Presample Filter Frequency

Programmable from:

4 Hz to 40 Hz for 400 Hz

4 Hz to 100 Hz for 1 kHz

4 Hz to 200 Hz for 2 kHz

Presample Filter Response

4th order Butterworth continuous time state variable, with cutoff frequency defined at the -0.5 dB point

AC Excitation

Program selectable for internal or external excitation

Internal AC Excitation Amplitude

Programmable amplitude from 1.0 to 5.0 Vrms with 4 digit resolution

Internal AC Excitation Frequency

Programmable to 400 Hz, 1 kHz or 2 kHz

Programmable Excitation Voltage Resolution

1.22 mV

Excitation Voltage Inaccuracy

0.2% of full scale at 400 Hz and 1 kHz

0.3% of full scale at 2 kHz

Phase Compensation

Programmable ±180 degrees with 4 digit resolution

Excitation Current

40 mA rms, maximum

Input Resistance

Greater than 245 kΩ on all inputs

Offset Resolution

0.05% of span

Offset Range

±100% of full scale input

External Balance

Each channel autobalances with the sensor connected setting the output to the user programmed percent of full scale (% FS)

Analog to Digital Conversion Resolution

12 bits

Best Straight Line Linearity

2 wire—0.1%

3 wire—0.25%

Input Gain

Programmable from 0.25 with 4 digit resolution

Data Output Direction

Programmable for Normal or Reversed Movement

Output Data Type

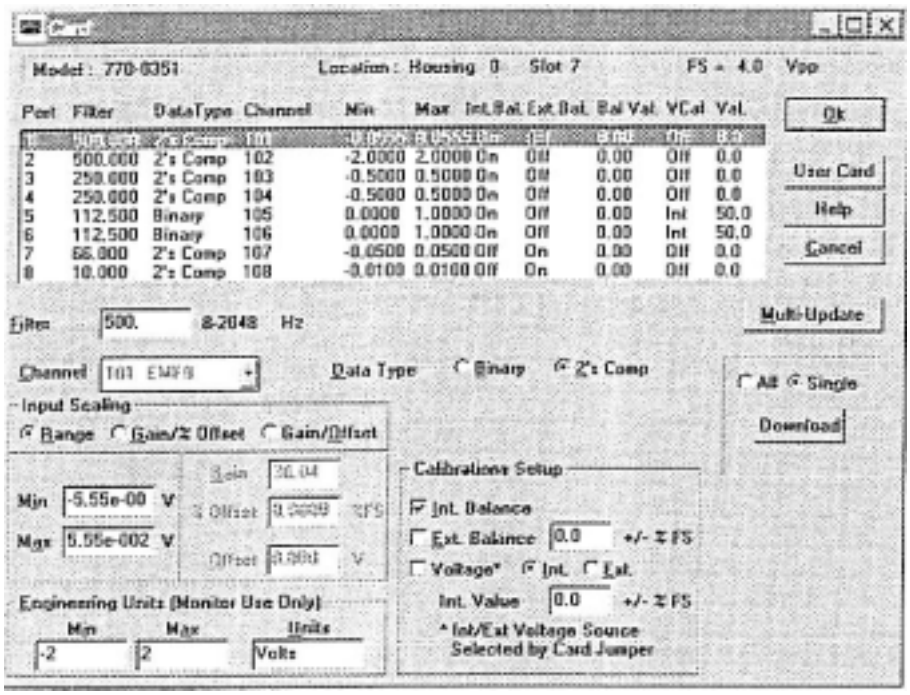
Programmable 2's complement or Binary

Voltage Calibration

Programmable summation voltage ±100% of full scale input

Note: Specifications subject to change without notice.

770-015x, 770-025x and 770-035x Low CMV EMF Signal Conditioners



CMV EMF signal conditioners are designed to accept common mode voltage (CMV) electromotive force (EMF) inputs from high impedance voltage sources. CMV EMF signal conditioners are available in two input voltage ranges; Low range (4 Vspan) and High range (100 V span).

Low CMV EMF signal conditioners are available with two, four or eight independently programmable signal conditioning channels for measuring inputs from 4 mV to 4V full scale, with CMVs up to 4V. Set gain, offset, and presample filter frequency from an easy to use set up screen.

HIGHLIGHTS

- Enter the input voltage range and the software calculates the required gain and offset
- Gain is continuously programmable from 1 to 1000
- Input scaling is programmable by input voltage range, gain and offset, or gain and percent offset
- Programmable calibration by internal or external autobalance, and internal orexternal voltage substitution
- Internal voltage source is programmable from –5 to +5 V with 1.25 mV resolution
- Filters are programmable over an eight octave frequency range with programming resolution of 4000 steps
- Cards are available in three presample filter frequency ranges

Dual signal conditioners have programmable AC or DC input coupling.

Dual and Quad signal conditioners have one analog to digital converter (ADC) per channel. This enables input data from each channel to be individually sampled by word, minor frame, or major frame at a rate of up to 40000 samples per second, per port.

Dual and Quad signal conditioners are available in three presample filter frequency ranges for

input voltage spans of 4 mV to 4V.

Octal signal conditioners have one multiplexed ADC. All eight channels are multiplexed to produce a single digital output. Data sampling can be performed on the multiplexed output at a maximum rate of 40000 samples per second.
Octal signal conditioners are available in three presample filter frequency ranges for input voltage spans of 4 mV to 4V.

Card Configuration

2, 4, or 8 independently programmable signal conditioning channels designed to accept CMV EMF inputs from high impedance voltage sources

Plug-In Cards

Dual Cards	**Presample**		**Programmable**
Part No.	**Filter**	**Order**	**Input Voltage Span**
770-0150	4 to 1024 Hz	8th	4 mV to 4 V bipolar or unipolar
770-0151	8 to 2048 Hz	8th	4 mV to 4 V bipolar or unipolar
770-0152	16 to 4096 Hz	8th	4 mV to 4 V bipolar or unipolar
Qual Cards	Presample		
Part No.	**Filter**	**Order**	**Input Voltage Span**
770-0250	4 to 1024 Hz	6th	4 mV to 4 V bipolar or unipolar
770-0251	8 to 2048 Hz	6th	4 mV to 4 V bipolar or unipolar
770-0252	16 to 4096 Hz	6th	4 mV to 4 V bipolar or unipolar
Octal Cards	Presample		
Part No.	**Filter**	**Order**	**Input Voltage Span**
770-0350	4 to 1024 Hz	4th	4 mV to 4 V bipolar or unipolar
770-0351	8 to 2048 Hz	4th	4 mV to 4 V bipolar or unipolar
770-0352	16 to 4096 Hz	4th	4 mV to 4 V bipolar or unipolar

Input voltage Resolution

10 μ V for input spans of 4 to 40 mV

100 μ V for input spans of 40 to 400 mV

1 μ V for input spans of 0.4 to 4 mV

Input Voltage Inaccuracy

0.15% maximum of programmed value at 25℃

Input Voltage Temperature Coefficient

0.0035% per℃ maximum

Input Sampling Rate

Dual and Quad cards: 40 kilosamples per second maximum per port, based on minimum time interval between samples

Octal cards: 40 kilosamples per second maximum per card, based on minimum time interval between samples

Presample Filter Frequency

Programmable over the specified frequency range with resolution of 4000 steps

Presample Filter Response

8th, 6th, or 4th order Butterworth, continuous time state variable, with cutoff frequency defined at the –0.5 dB point

Input Common Mode Voltage

±4V maximum, for specified CMRR

Maximum Safe Input Voltage

±35V, AC or DC,either input to ground

Common Mode Rejection Ratio

With 100 ohm bridge:

120 dB minimum for input spans of 4 to 40 mV

106 dB minimum for input spans of 40 to 400 mV

90 dB minimum for input spans of 0.4 to 40 V

Differential Input Resistance

10 MΩ minimum

Common Mode Input Resistance

2.5 MΩ minimum

Offset Range

Dual and Quad cards: Bipolar, ±75% of span, referred to input

Octal cards: Birolar, ±50% of span, referred to input

Offset Resolution

0.35% of span

Offset Inaccuracy

0.05% of span maximum

Autobalance Range

Dual and Quad cards: Bipolar, ±75% of span, referred to input

Octal cards: Birolar, ±100% of span, referred to input

Autobalance Resolution

0.012% of span

Autobalance Inaccuracy

0.05% of span

AC/DC Coupling

Programmable

AC Coupling Cutoff Frequency

0.1 Hz maximum (Dual Card only)

Output Offset With AC Coupling

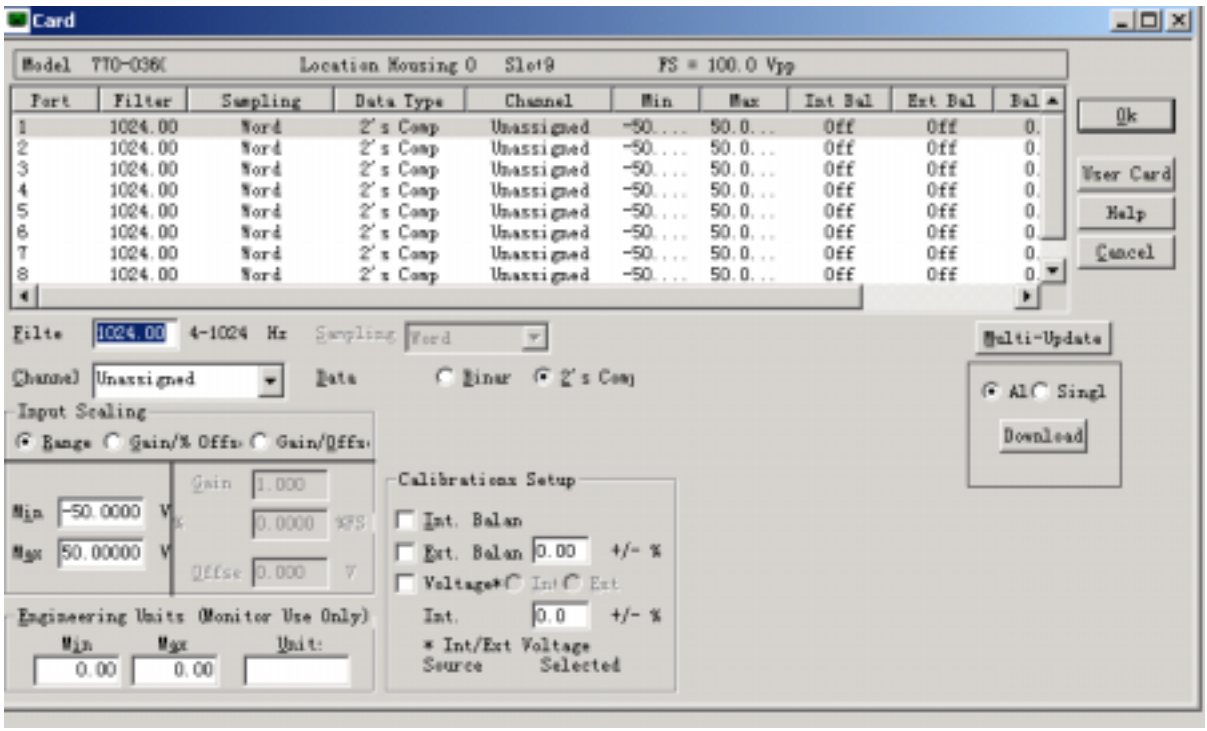
Less than 1 LSB for 12 bits (Dual Card only)

Analog Monitor Output

±1V from 1000 ohm source (Dual Card only)

Note: Specifications subject to change without notice.

770-016x, 770-026x and 770-036x High CMV EMF Signal Conditioners



CMV EMF signal conditioners are designed to accept common mode voltage (CMV) electromotive force (EMF) inputs from high impedance voltage sources. CMV EMF signal conditioners are available in two input voltage ranges; Low range (4V span) and High range (100V span).

High CMV EMF signal conditioners are available with two, four, or eight independently programmable signal conditioning channels for measuring inputs from 100 mV to 100V full scale, with CMVs up to 100V. Set gain, offset, and presample filter frequency from an easy to use set up screen.

HIGHLIGHTS

- Cards are available in three presample filter frequency ranges
- Enter the input voltage range and the software calculates the required gain and offset
- Gain is continuously programmable from 1 to 1000
- Input scaling is programmable by input voltage range, gain and offset, or gain and percent offset
- Programmable calibration by internal or external autobalance, and internal or external voltage substitution
- Filters are programmable over an eight octave frequency range with programming resolution of 4000 steps

Dual signal conditioners have programmable AC or DC input coupling. AC coupling removes all DC bias or offset voltage from the input signal. AC is often used for vibration signals in which only the frequency or peak-to –peak amplitude are of interest. DC coupling is used when the actual input voltage importamt, such as with strain gages.
Dual and Quad signal conditioners have one analog to digital converter (ADC) per channel. This enables input data from each channel to be individually sampled by word, minor frame, or major frame at a rate of up to 40000 samlpes per second, per port.
Daul and Quad signal conditioners are available in three presample filter frequency ranges for input voltage spans of 100 mV to 100 V.
Octal signal conditioners have one multiplexed ADC. All eight channels are multiplexed to produce a single digital output. Data sampling can be performed on the multiplexed output at a maximum rate of 40000 samples per second.
Octal signal conditioners are available in three presample filter frequency ranges for input voltage spans of 100 mV to 100 V.

Card Configuration

2, 4, or 8 independently programmable signal conditioning channels designed to accept CMV EMF inputs from high impedance voltage sources

Plug-In Cards

Dual Cards Presample Programmable

Part No.	Filter	Order	Input Voltage Span
770-0160	4 to 1024 Hz	8th	100mV to 100V bipclar or unipolar
770-0161	8 to 2048 Hz	8th	100mV to 100V bipclar or unipolar
770-0162	16 to 4096 Hz	8th	100mV to 100V bipclar or unipolar

Quad Cards Prdsample

Part No.	Filter	Order	Input Voltage Span
770-0260	4 to 1024 Hz	6th	100mV to 100V bipclar or unipolar
770-0261	8 to 2048 Hz	6th	100mV to 100V bipclar or unipolar
770-0262	16 to 4096 Hz	6th	100mV to 100V bipclar or unipolar

Octal Cards Prdsample

Part No.	Filter	Order	Input Voltage Span
770-0360	4 to 1024 Hz	4th	100mV to 100V bipclar or unipolar
770-0361	8 to 2048 Hz	4th	100mV to 100V bipclar or unipolar
770-0362	16 to 4096 Hz	4th	100mV to 100V bipclar or unipolar

Input voltage Resolution

0.25 mV for input spans of 0.1 to 1V
2.50 mV for input spans of 1 to 10V
25.0 mV for input spans of 10 to 100V

Input Voltage Inaccuracy

0.2% maximum of programmed value at 25℃

Input Voltage Temperature Coefficient

Dual and Quad cards: 0.004% per℃ maximum
Octal cards: 0.006% per℃ maximum

Input Sampling Rate

Dual and Quad cards: 40 kilosamples per second maximum per port, based on minimum time interval between samples
Octal cards: 40 kilosamples per second maximum per card, based on minimum time interval between samples

Presample Filter Frequency

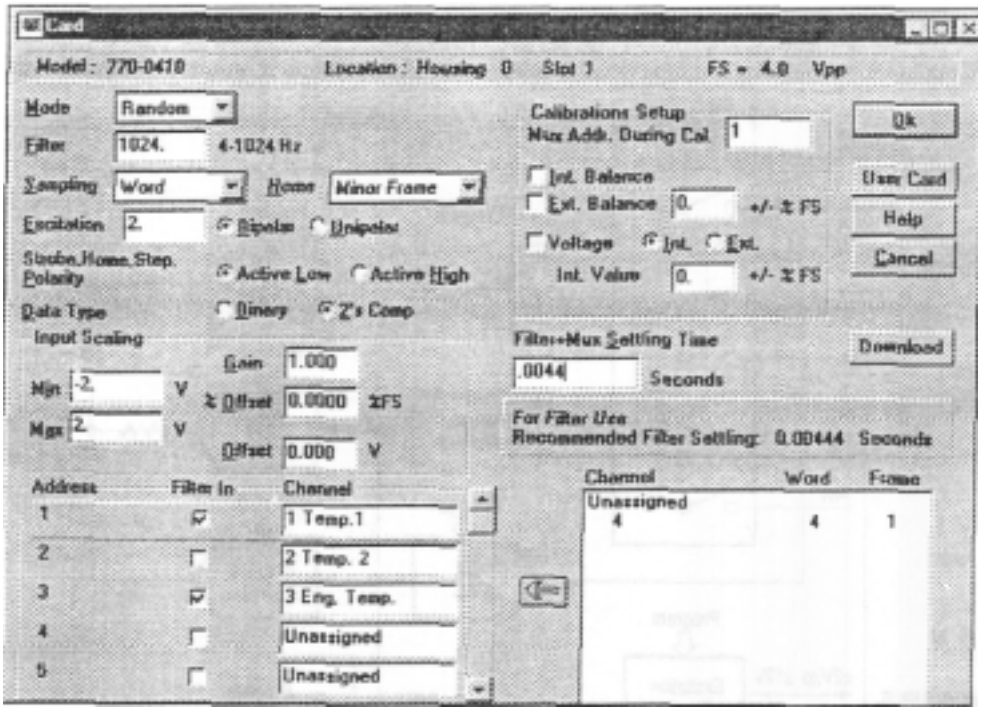
Programmable over the specified frequency range with resolution of 4000 steps

Presample Filter Response

8th, 6th, or 4th order Butterworth, continuous time state variable, with cutoff frequency defined at the –0.5 dB point

Input Common Mode Voltage
　　±100V minimum, for specified CMRR
Maximum Safe Input Voltage
　　±200V, AC or DC, either input to ground
Common Mode Rejection Ratio
　　With 50 ohm source:
　　86 dB minimum for input spans of 0.1 to 1 V
　　76 dB minimum for input spans of 1 to 10 V
　　60 dB minimum for input spans of 10 to 100 V
Differential Input Resistance
　　400kΩ±1% with power on or off
Common Mode Input Resistance
　　100kΩ±1% with power on or off
Offset Range
　　Bipolar, ±50% of span,referred to input
Offset Resolution
　　0.35% of span
Offset Inaccuracy
　　0.05% of span maximum
Autobalance Range
　　Bipolar, ±50% of span
Autobalance Resolution
　　0.012% of span
Autobalance Inaccuracy
　　0.05% of span
External VCAL Range
　　10 mV to 10 V DC
AC/DC Coupling
　　Programmable (Dual Card only)
Output Offset With AC Coupling
　　Less than 1 LSB for 12 bits (Dual Card only)
Analog Monitor Output
　　±1 V from 1000 ohm source (Dual Card only)
Note: Specifications subject to change without notice.

770-0410 Thermocouple/Pressure Scanner



The Thermocouple/Pressure Scanner Addresser and Signal Conditioner card is designed to interface to multiplexed thermocouples and pressure scanning systems. The card generates the appreprate address to sequentially or randomly address the multiplexing systems. The differential voltage output of the thermocouple or pressure scanning system is signal conditioned and digitized for insertion in the PCM frame. The signal conditioner has differential inputs, accepts high impedance voltage sources from 4 mV to 4V, and provides programmable gain, offset, and rpesample filtering.

HIGHLIGHTS

- Butterworth 6th order, non-sampled state variable, filter with cutoff frequency defined at the –0.5 dB point
- Continuously programmable gain from 1 to 1000 with programmable offset capability
- Filters are programmable from 4 to 1024 Hz with programming resolution of 4000 steps over the specified frequency range

Card Configuration

Plug-in card provides signal conditioning, excitation, and addressing for thermocouple and pressurd scanner systems

Multiplexer Addressing

Eight address bits, plus STROBE, HOME, STEP, and a retum line

Input Voltage Span

Programmable from 4 mV to 4 V, bipolar or unipolar

Input Voltage Resolution

10 μV for input spans of 4 to 40 mV

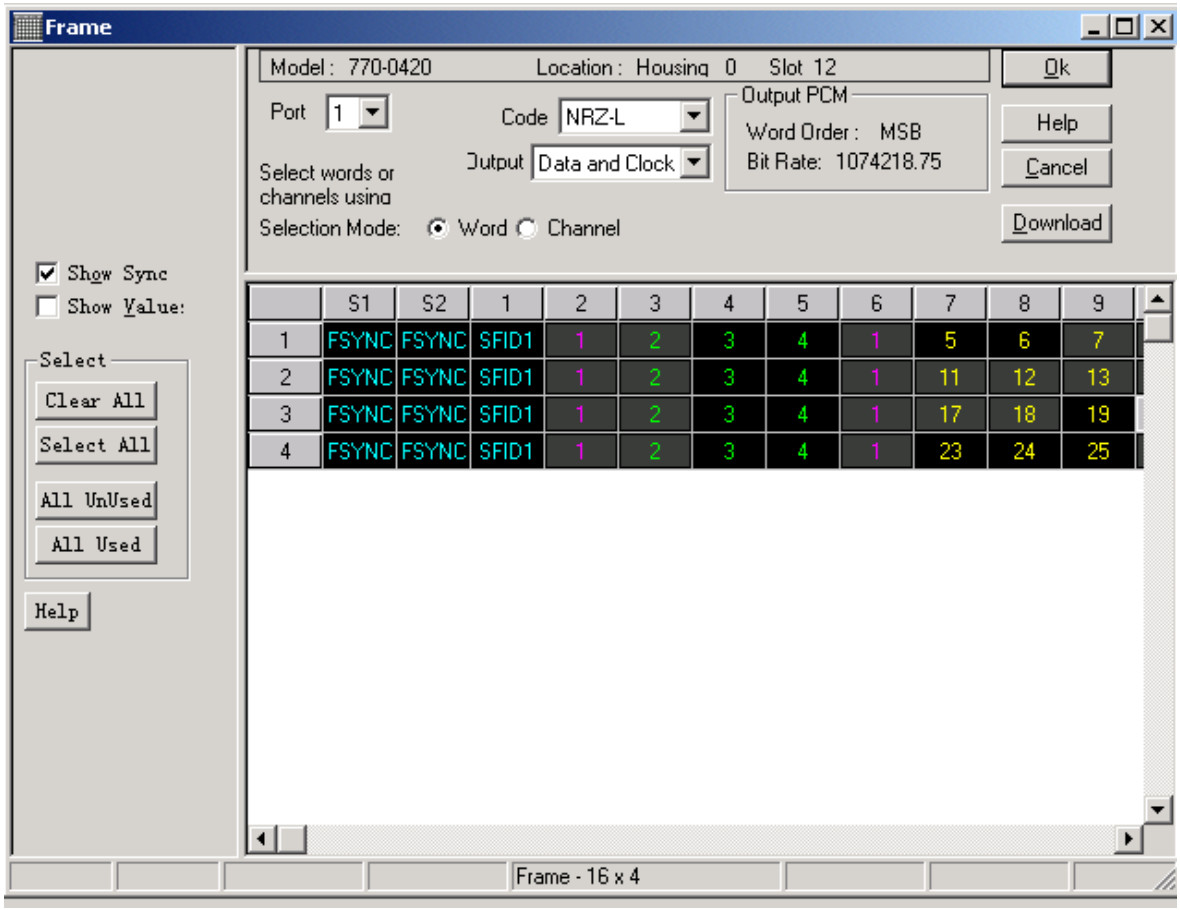
100 μV for input spans of 40 to 400 mV

1 mV for input spans of 0.4 to 4 V

Input Vltage Inaccuracy
0.15% maximum of programmed value at 25℃
Input voltage Temperature Coefficient
0.0035% per℃ maximum
Programmable Excitation Range
±2.0 to 12.0 V, or ±15.0 V
Programmable Excitation Resolution
10.0 mV
Programmable Excitation Inaccuracy
12.5 mV maximum, over full operating temperature range
Excitation Current
20 mA maximum
Input Common Mode Voltage
±4V minimum, for specified common mode rejection ratio (CMRR)
Maximum Safe Input Voltage
±5V, AC or DC, either input or ground
Common Mode Rejection Ratio
With EMF inputs and 1000 ohm source:
114 dB minimum for input spans of 4 to 40mV
100 dB minimum for input spans of 40 to 400mV
86 dB minimum for input spans of 0.4 to 4V
Differential Input Resistance
10 MΩ ±1% with power on or off
Common Mode Input Resistance
2.5 MΩ ±1% with power on or off resistance
Offset Range
Bipolar, ±75% of span, referred to input
Offset Resolution
0.035% of span
Offset Inaccuracy
0.05% of span maximum
Autobalance Range
±75% of full scale minimum
Autobalance Resolution
0.012% of full scale
Autobalance Inaccuracy
0.05% of full scale

Note: Specifications subject to change without notice.

770-0420 Selected Word PCM Output Card



The Selected Word PCM Output Card has the ability to select an entire frame for output at the same bit rate or to select specific words for output at a submultiple of the bit rate.
Two independent PCM outputs are available, each with its own subset of selected words. This card can only be installed in the Maste System Housing, as it captures selected data directly from the system data bus.

HIGHLIGHTS

- Two independently programmable channels, each with its own subset of selected words
- Preserves wide-band channel sample rates and down-samples slow channel data

Card Configuration

Plug-in card has the ability to select the entire frame or specific words for output at a submultiple of the bit rate. Two independent PCM outputs are available, each with its own subset of selected words.

Output PCM Bit Rate

Programmable as 1/1, 1/2, 1/4, 1/8 or 1/16 of the merge output bit rate

Selected Words

Programmable as two independent subsets of selected words taken from the 770 System's

PCM frame

Selected Word Rate

Each selected word has its own programmable samlpe rate, therefore it is possible to capture only a subset of the samlpes, or every sample of the word appearing in the 770 System's PCM frame

Initial Output Time Delay

Programmable time delay between start of 770 System's PCM frame output and start of selected word frame output is provided for accurate time correlation

Serial PCM Codes

Code selection is programmable to any of the following IRIG formats:

Non-return to zero NRZ-L

Randomized NRZ RNRZ-L

Bi-phase BiØ-L

Serial PCM Output

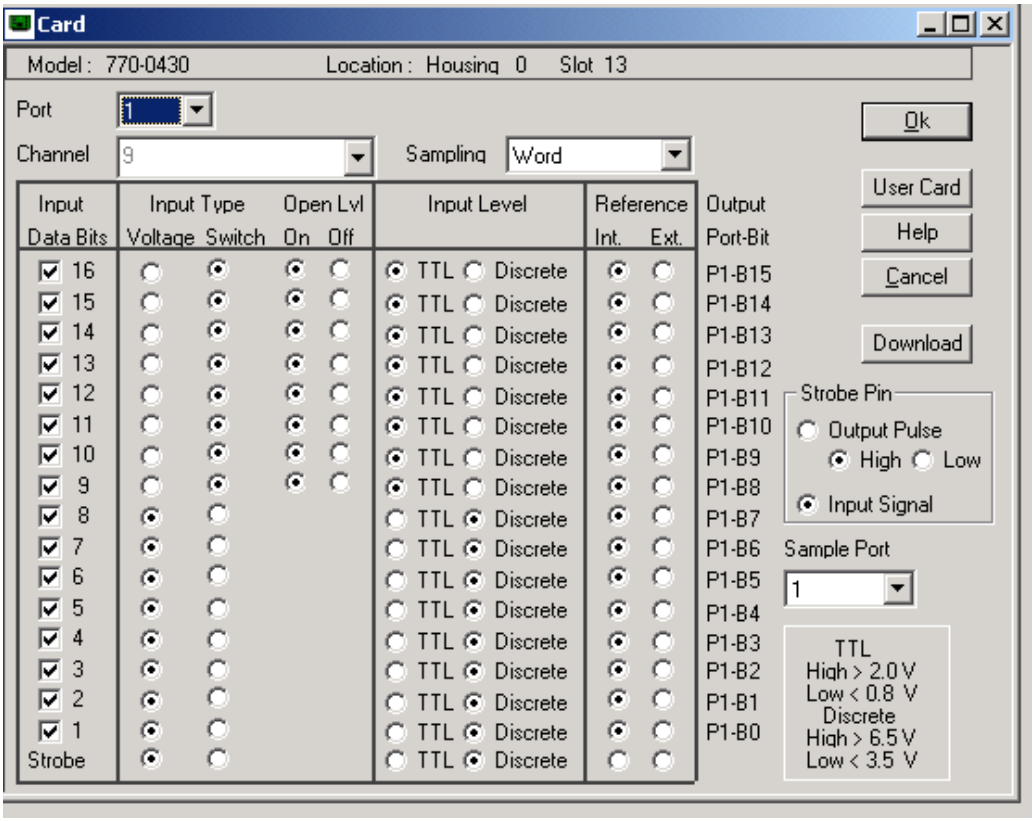
PCM outputs and bit rate clocks are available on housing connector

Output Level

RS-422 compatible

Note: Specifications subject to change without notice.

770-0430 Sixteen Channel Bilevel Multiplexer



This Bilevel Multiplexer card has the ability to detect sixteen events, which can be independently assigned to four different card ports for insertion into the PCM output. Each port can be sampled independently by PCM channel word or synchronously by frame sync, port, or external strobe input. The strobe pin is programmable as an input for externally latching bilevel data or as an output for use by customer equipment.

HIGHLIGHTS

- Sixteen indedpendent inputs for detecting voltage and switch signals
- Threshold voltage is selectable for TTL logic or discrete (ARINC)717 switch signals
- Reference ground is selectable for each input
- Open-circuit switch inputs have selectable high (On) or low (Off) state
- All signal inputs provide 150 kilohm, 100 volt isolation
- Strobe pin is programmable for input or output

Card Configuration

Sixteen bilevel inputs for switch or voltage signals. Each input has independently programmable threshold voltage level, reference ground, open-circuit high or low state, and output port.

Bilevel Inputs

16

Input Type

Voltage or switch, programmable

Input Open-Circuit Level

Switches have open-circuit input levels programmable as either on (high) or off (low).

Input Level

TTL or discrete switch, programmable

TTL Voltage threshold

Compatible with industry standards for TTL and 5 volt
CMOS logic. High>2.0V.Low<0.8V.

Discrete Voltage Threshold

Compatible with ARINC 717 and RTCA DO-160 voltage levels for discrete switch type inputs. Can also be used with high level logic such as 10 volt CMOS.
High>6.5 V. Low<3.5V.

Input Impedance

150kW minimum

Input Voltage Range

±100V

Maximum Input Voltage

±100V

Reference Ground

External or system ground, independently programmable for all bilevel and strobe inputs. External selection provides low noise reference for logic signals.

Ports

1 to 4 ports, each with 4 to 16 bits per word. Bilevel inputs can be independently assigned to one of the four ports for insertion into the PCM output.

Sampling

All bilevel inputs assigned to a port are sampled at the same time. Each port can be programmed for sampling by word, major frame, minor frame, external strobe, or when another port on the card is sampled.

Strobe

Input or output, programmable

Strobe Input

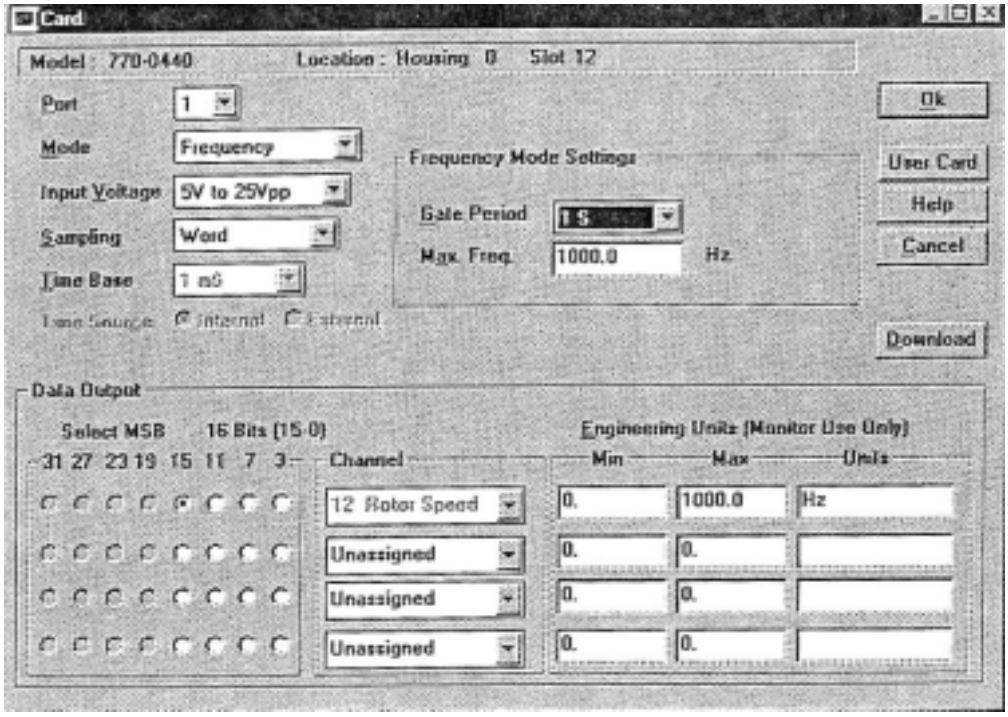
The strobe input can control the sample time of any port programmed to use external sampling. Sampling occurs when the strobe level rises above the voltage threshold, which is programmed like any bilevel input. After a strobe occurs, the input is disabled until the card port data is read for insertion in the PCM output.

Strobe Output

The strobe output produces a TTL compatible output pulse when any port is accessed for insertion intp the PCM output. The output pulse is programmable as a high or low pulse with duration of one word clock.

Note: Specifications subject to change without notice.

770-0440 Dual Pulse Measuring Card



This card is a universal pulse measuring card device with two independent channels for measuring pulse frequency, period, time, mark time, and totals with 32-bit capacity. All functions are user programmable, including the internal time base.

HIGHLIGHTS

- Two programmable measurement channels
- Five programmable modes of operation
- Non-volatile memory for data retention during system power outage
- Users internal or external clock source
- Programmable bit selection allows output to be formated in one or more PCM words

Card Configuration

Plug-in card provides two channels for mesauring pulse frequency, period, time, mark time and totals using 32-bit counters

Operating Modes

Programmable selection of five operating modes:
Frequency, period, totalizer, timer and mark time

Data Inputs

Two low-level, AC coupled, differential channels(A and B)

AC Coupling Frequnecy

0.1 Hz

Data Input Voltage

4 mVpp to 40 Vpp

Input Slew Rate

2 V/s minimum

Input Pulse Width

10µsec minimum

Differential Input Impedance

100 kΩ minimum for all conditions

Common Mode Input Resistance

25 kΩ minimum

Input Waveform

Sine, square, or pulse

Source Impedance

10 kΩ maximum

Maximum Safe Input

40 Vpp

Reset Inputs

Two, active low, TTL compatible inputs for externally resetting counters during totalizer and timer modes

Data Retention

Non-volative memory for data retention after system power outage

Frequency Mode

Two 16-bit channels MSB programmable across nibble boundaries. Pulse frequency is measured by applying signal to DATA input and counting pusitive transitions of the input while the counter is enabled to the programmable internal gate periods.

Input Frequency

1 Hz to 64 kHz

Frequency Resolution

100 ns update of the calculated step site

Frequency Accuracy

0.1%

Internal Gate Period

200, 500, ns, 1, 2, 5, 10, 20, 50, 100, 200, 500 µs, 1, 2, 5, 10, 20, 50, 100, 200, 500 ms, and 1 second

Period Mode

Programmable as two 16-bit channels MSB programmable across nibble boundaries (Port 1 & Port 2). Pulse period is measured by applying signal to DATA input while counting clock pulses, between positive transitions of the signal, using one of the seven programmable internal time bases.

Input Frequency

0.1 Hz to 64 kHz

Period Resolution

±1 count of selected time base

Internal Time Base

200, 500, ns, 1, 2, 5, 10, 20, 50, 100, 200, 500 µs, 1, 2, 5, 10, 20, 50, 100, 200, 500 ms, and 1 second

Totalizer Mode

Programmable as two 32-bit channels MSB programmable across nibble boundaries (Port 1 & Port 2). Total is measured by applying signal to DATA input and counting positive transitions of the signal.

Input Frequency

1 Hz to 64 kHz

Count Resolution

One count per pulse or event

External Reset

One reset per channel, active low, TTL compatible

Time Mode

Provides two 32-bit timers MSB programmable across nibble boundaries (Port 1 & Port 2). A logic low input signal holds count at zero. A logic high signal allows counter to increment at rate selected by one of the programmable internal time bases.

Input frequency

up to 5 kHz

Time Resolution

±1 count of selected time base

Internal Time Base

200, 500, ns, 1, 2, 5, 10, 20, 50, 100, 200, 500 µs, 1, 2, 5, 10, 20, 50, 100, 200, 500 ms, and 1 second

Mark Timer Mode

Provides two 32-bit timers MSB programmable across nibble boundaries (A and B). Operation is similar to stopwatch lap timer, which captures time that event occurred, but allows timer to keep running. A positive transition of the input signal latches the current count for insertion in the PCM stream. Timer is zeroed by external reset. Internal or external time base may be used. Specifications same as for Timer mode except for External Time Base and External Reset.

External Time Base

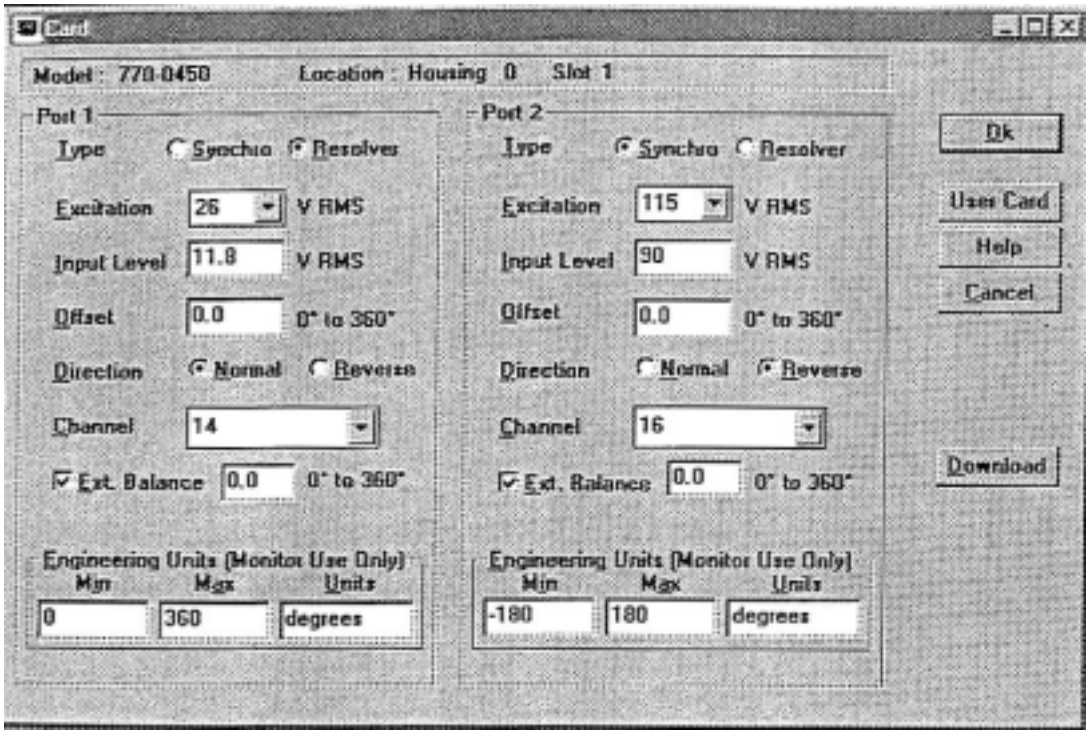
Up to 5 kHz. Applied to signal input of channel B.

Excludes channel B timer operation.

External Reset

One reset per channel, active low, TTL compatible

770-0450 Dual Synchro/Resolver Card



The Dual Synchro/Resolver Card converts 5-wire synchro or 6-wire resolver inputs to 16-bit digital words. Each card has two converter channels. Each channel is independently programmable for either synchro or resolver operation. Input reference and input signal voltages are programmable for industry standard values.

HIGHLIGHTS

- Two independently programmable measurement channels
- Each channel can be programmed for synchro or resolver operation
- Input reference voltage programmable for 26 or 115V at 400 Hz
- Input signal voltage programmable for 11.5V to 115 V in 4096 steps at 400 Hz

Card Configuration

Plug-in card has two independently programmable synchro or resolver converters providing 4 to 16-bit digital outputs

Operating Modes

Each channel can be programmed for synchro or resolver operation

Inputs

Two sets of signal and reference input connections:

5-wire synchro: S1, S2, S3, R1, R2

6-wire resolver: S1, S2, S3, S4, R1, R2

Reference Input Voltage

Programmable for 26 or 115 volts rms at 400 Hz

Signal Input Voltage

Programmable for 11.5 to 115 volts rms with programming resolution of 4000 steps at 400

Hz

Maximum Input Voltage

150 V rms

Input Impedance

180 kΩ minimum

Analog to Digital Conversion Resolution

16 bits

Accuracy

±10 arc minutes

Accuracy Temperature Coefficient

10 arc seconds/℃

Slew/Scan Rate

720 degrees per second

PCM Output Format

Binary

Output Balance

Zero reference adjustable range form 0 to 360 degrees

Output Offset

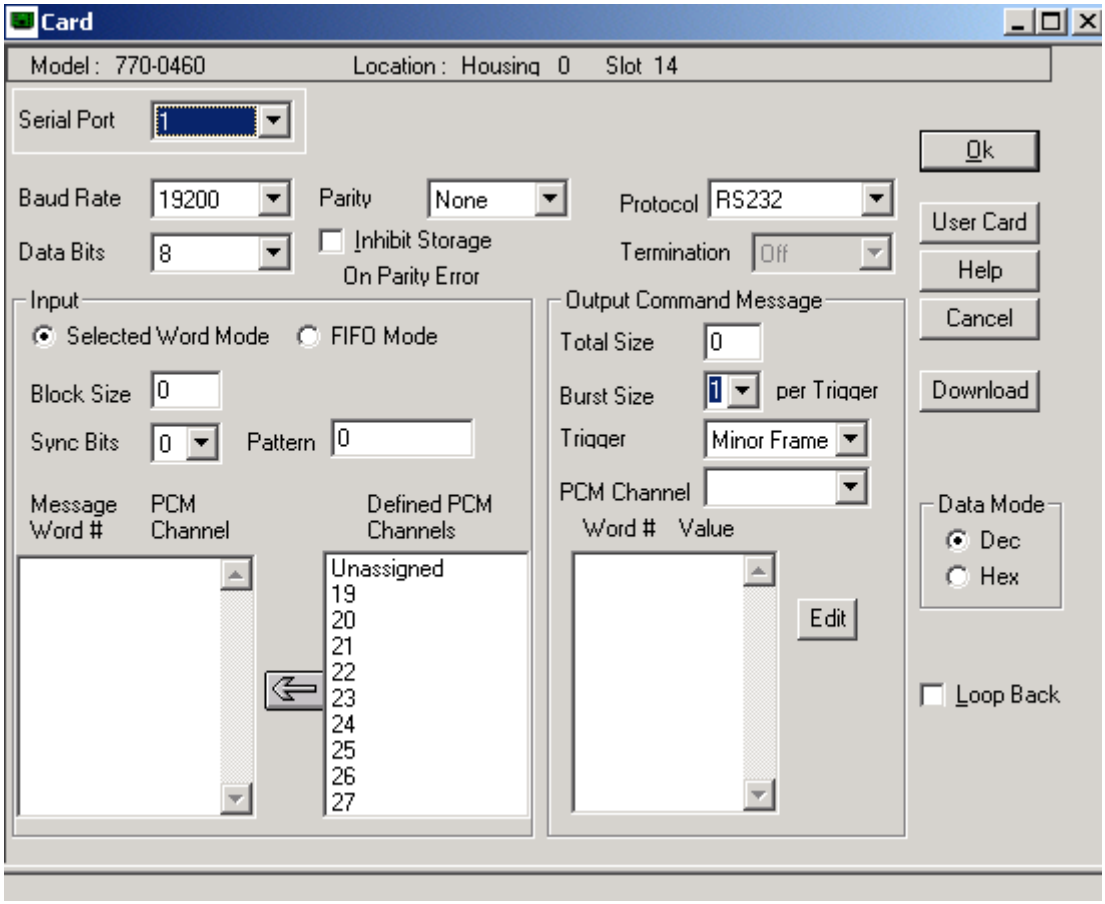
Programmable from 0 to 360 degrees with 0.1 degree resolution

Output Direction

Programmable for Normal or Reverse

Note: Specifications subject to change without notice.

770-0460 Dual RS-232/422/485 Serial Interface



The Serial Interface Card accepts RS-232, RS-422, or RS-485 input data and formats it for insertion into the PCM stream. Each interface can be programmed to search for various synchronization and identification labels and to capture up to 512 selected data words. If desired, all data can be captured and assigned to one PCM channel as an IRIG 106-96 asynchronous data channel. Each interface can transmit up to 128 command words to initiate communications with customer equipment.

HIGHLIGHTS

- Independent channels with RS-232, RS-422 and RS-485 serial receivers and transmitters
- Programmable baud rate, bits per word, start bits, stop bits, and parity per channel
- Programmable search and capture can acquire GPS and other serial data
- Input signals and returns are buffered to isolate user equipment

Card Configuration

Plug-in card provides two independent serial interfaces for capturing data for insertion into the PCM output

Interface Levels

RS-232, RS-422, or RS-485, programmable

Input Impedance

12 kΩ minimum for RS-422 and RS-485

3 kΩ minimum for RS-232

Maximum Safe Input Voltage

±25 volts

Baud Rate

300 to 115,200 baud, programmable

Bits Per Word

7 or 8 bits, programmable

Parity

Enabled or disabled, programmable

Synchronization

Message identification code pattern can be up to 3 bytes long

PCM Word Length

8 to 16 bits, MSB first

All Word Capture Mode

Interface captures all serial data words and assigns them to one PCM channel as an IRIG 106-96 asynchronous data channel. FIFO data buffer provides storgae for up to 1024 words cintaining data with a stale data bit and overflow bit. To prevent buffer overflow and loss of data, user must ensure that output PCM sample rate is greather than the input serial word rate.

Selected Word Capture Mode

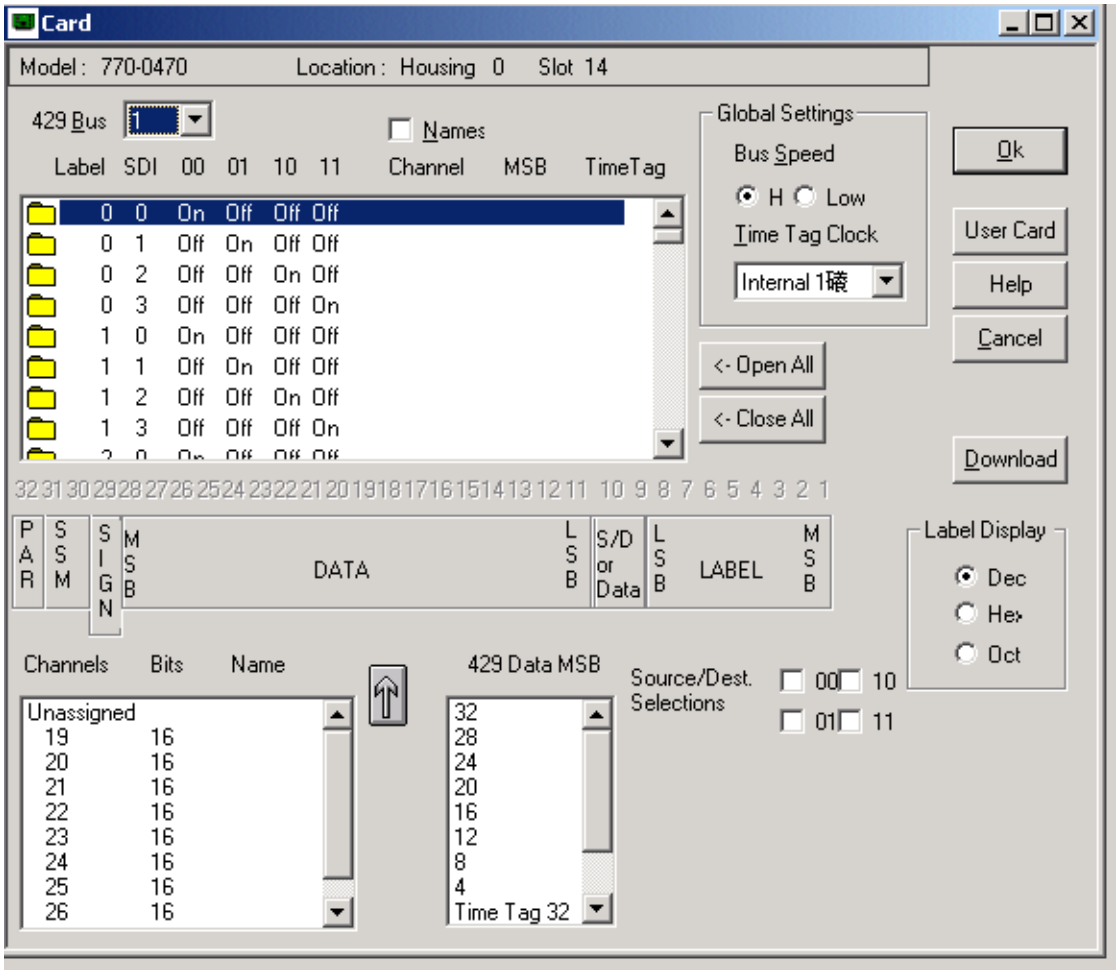
Interface scans serial input for the occurrence of the user programmed message indentification code followed by one or more data words. Up to 1024 data words can be selected for capture.

Transmit Mode

Provides ability to initiate communications with customer equipment. User can program up to 128 command words to be transmitted at system turn-on or repeated at the PCM major or minor frame rate.

Note: Specifications subject to change without notice.

770-0470 ARINC 429 Avionics Bus Monitor Card



The ARINC 429 Avionics Bus Monitor Card provides the capability to monitor two avionics buses and selectively acquire data, up to 256 labels with selectable source destination identification (SDI) codes per bus. The data is then formatted into words for insertion into the PCM stream. The card provides programmable bus speed selection and is fully compatible as an ARINC 429 “sink”.
This ARINC 429 card is capable of time tagging received data words. Time tag mode is selectable from an internal 1 ms clock, an internal 1 µs clock, or an external clock source. By assigning PCM words, 32 bits of time tag data is selectable for each lable. The card also has an extrnal time tag reset for synchronizing multiple cards.

HIGHLIGHTS

- Monitors two ARINC 429 buses
- Programmable speed selection for high speed (100 kbps) or low speed (12.5 kbps) bus
- Captures up to 256 labels per bus, with selectable SDI codes
- Captures up to 512 labels per card
- Programmable bit selection allows label data to be formatted into one or more PCM words

- Time tag is selectable from an internal or external clock source with and external reset, for synchronizing multiple cards
- Provides 32 bits of time tag data for each label

Card Configuration

Plug-in card provides capability of monitoring and acquiring 512 labels from 2 avionics buses. Card functions as “sink” on ARINC 429 bus.

Input Voltage Span

±13 V fully compatible with ARINC 429 “sink” requirements

Maximum Safe Input

±29 V DC from either input to ground, or 30 V AC applied across inputs of either bus port

Transient Protection

IEC 1000-4-2 (ESD)

ESD Protection

>15 kV IEC 1000-4-4 (EFT)

Input Impedance

12 kΩ minimum, shunted by 50 pF maximum. Fully compatible with ARINC 429 “sink” requirements.

Programmable Speed Selection

Selectable for high-speed (100 kbps) or low speed (12.5 kbps) ARINC 429 bus. Both inputs must be the same speed.

Capture Capability

Up to 512 labels total, allocated in any combination between the two ARINC 429 ports

Source Destination Identification (SDI)

Each label can be programmed to recognize all SDI codes or only selected codes

Formatting

Programmable format permits each 32-bit ARINC word to be broken into contiguous bits, starting at any 4-bit boundary, and output as 1 to 8 PCM words.

Data Integrity

Prior to updating label information, the card checks to see if the PCM system is accessing that label. If so, the card delays updating until the access is complete.

Time Tag Mode

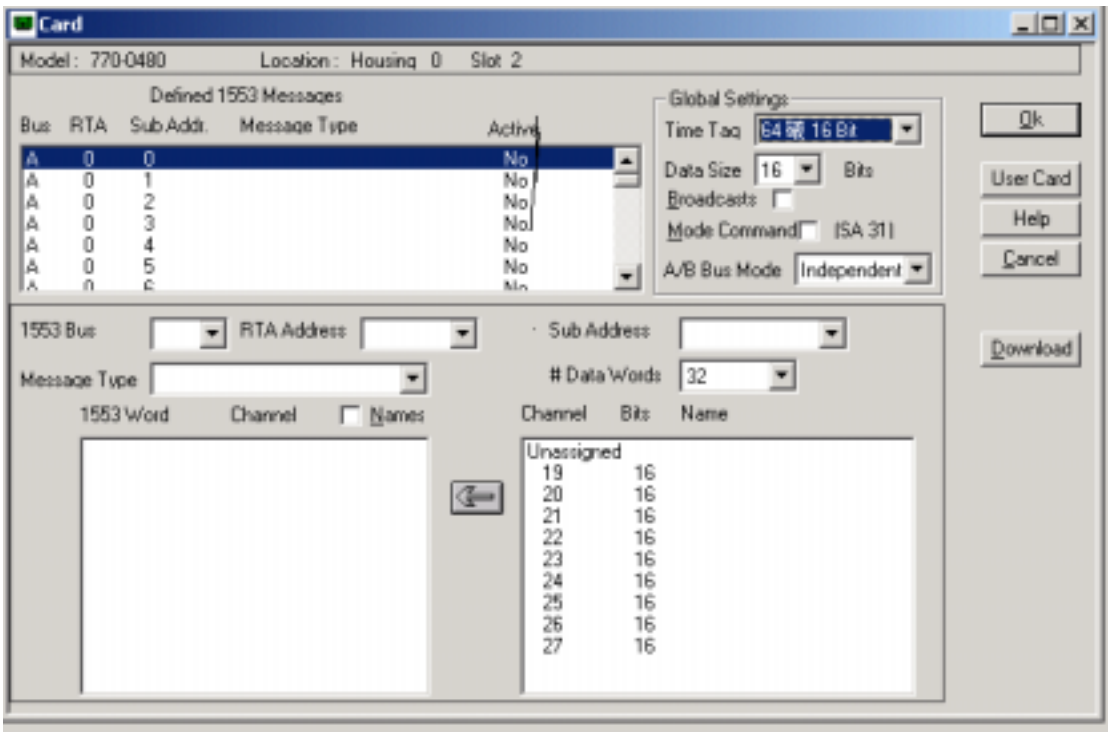
Selectable from an internal 1 ms clock, an internal 1 μs clock, or an external clock source.

Time Tag Data

Provides 32 bits of time tag data selectable for each label by assigning PCM words.

Note: Specifications subject to change without notice.

770-0480 MIL-STD-1553 Bus Monitor Card



The MIL-STD-1553 Bus Monitor Card captures command, status, and data for up to 256 selected terminal addresses. The user can capture all data words or just selected data words of each message. Each message received can be time tagged using an external IRIG B time code input or other serial data input, or using the internal counter with an internal or external clock source.
The card monitors dual independent or redundant buses (A and B) through an external Bus Coupler Interface. Independent bus mode enables data from bus A to be output on one PCM channel, while the data from bus B is output on a different PCM channel. Redundant mode enables the data on both buses to be output on the dame PCM channel. This is useful when the same data is being transmitted on both buses and one bus drops out.

HIGHLIGHTS

- Captures up to 256 selected terminal addresses
- Includes message status word for each message to ensure data integrity
- Time tags each captured message with IRIG or other time code
- Output selected commands, status, and message data words
- Output data sample rate is independent of input message rate
- Monitors dual independent or redundant buses

Card Configuration

The card monitors dual independent or redundant MIL-STD-1553 aircraft data bus (A and B) via external Bus Coupler Interface (supplied). Each captured label is time tagged using external IRIG B time code or serial data input or using internal counter driven by internal or external colck input

Bus Data Rate

1 megabits per second, per MIL-STD-1553

Bus Impedance

70 to 85 ohms, per MIL-STD-1553

Bus Switchover

When monitoring redundant buses, the card monitors communications and automatically switches over to the active bus

Bus Configuration

A typical MIL-STD-1553 system (Figure 2) includes a Bus Controller and up to 32 Remote Terminals. Bus Monitors such as the Metraplex MIL-STD-1553 card, can be connected to passively monitor bus traffic.

Bus Stub Connections

Jumper selectable for either transformer coupled stub or direct coupled stub connection. Bus Coupler Interface includes built-in isolation resistors and coupling transformers.

Note: Transformer coupled stub operation requires customer supplied Transformer Bus Couplers for connection to MIL-STD-1553 trunk.

Bus Connection Distances

Bus A or B trunk to Bus Coupler Interface is per MIL-STD-1553 for transformer or direct connection method. Bus Coupler Interface to 1553 card is 10 feet maximum.

Bus Word Format

The MIL-STD-1553 bus carries three types of words (Figure 3). Each word is 20 bits long and includes 4 bits of sync and parity information. All Remote Terminals on the bus are identified by a unique Remote Terminal Address (RTA). A Subaddress (RTS) or Mode command can also be passed to a Remote Terminal along with a Mode Code to identify subfunctions. The Data Word Count specifies the number of data words to be transmitted or received.

Bus Protocol

The card can monitor and capture all MIL-STD-1553 word protacols. The protocols shown in Figure 4 are typical.

Message Input Rate

The card can capture all messages appearing on the bus. (The maximum capacity of the MIL-STD-1553 bus system is about 40,000 words per second.)

Message Output Rate

The message output rate is independent of the input rate. Captured data words are stored in memory and can be sampled at any desired output rate for insertion into the PCM stream. This feature allows the user to samole slowly changing data, such as temperature, at a rate less than the input. Critical data must be sampled faster than the input rate to ensure that no data is lost.

Software Setup

The card is fully programmable by the 770 System software. Bus addresses, subaddresses, and data to be captured are individually programmable for each card. Output words may be inserted into any desired PCM word position in the frame map.

Monitor Mode

Captures label words

Selected Lables

Programmable capture of up to 256 Remote Terminal Address and Subaddress combinations (256 labels), including selection of transmit, receive, or both directions.

Selected Words

The card captures all command, status, and data words associated with each selected label. All captured words are available for insertion into the PCM stream.

Transmission Status (TXST)

The card analyzes every bus word associated with the selected label and generates a transmission status word (TXST) containing three flag bits: a source bus indicator (BI) where 0 = bus A, a protocol error (ER), and a selftest program fail (PF).

Note: The TXST word also includes a message count indication the total number of messages received for each selected label.

Time Tag (TIME)

The card generates a time tag word (TIME) that marks the receipt of the command word of each label. Time tags are obtained from a counter driven by an internal 64 μs time base. This time tag is placed in the least significant byte of the TIME word.

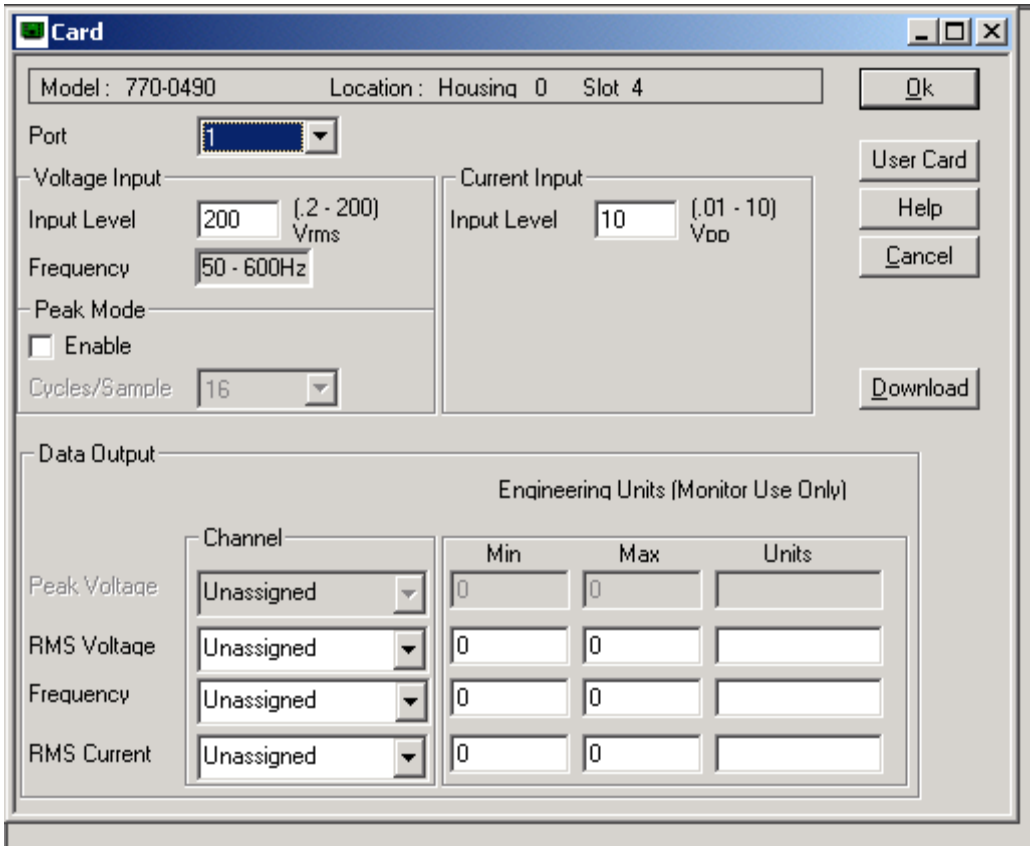
Output Data

Programmable insertion into the PCM steam of any or all command, status, and data (up to

32 words) transmitted and/or received by bus device associated with selected labels, plus internally generated time tag and transmit status words.

Note: Specifications subject to change without notice.

770-0490 AC Monitor Card



The AC Monitor Card is designed to monitor the AC power voltage and current buses of the system under test. Each channel has an independent multiplexed analog to digital converter (ADC), and separate inputs for monitoring current and voltage.

The card measures both the average and peak-to –peak voltages (vpp) so the user can detect power line ripple and dropouts. The average input waveform frequency is measured using high precision counting of zerophase crossings. With a user supplied external transformer and load resistor, the card can measure rms current.

HIGHLIGHTS

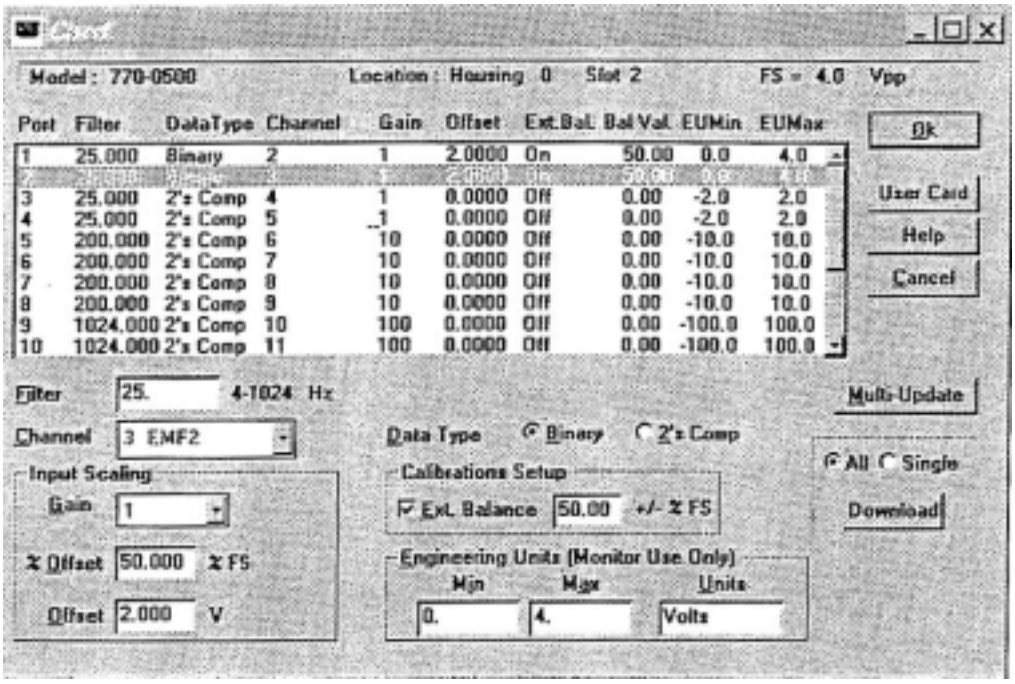
- Two independent channels per card with one multiplexed ADC per channel
- Measure rms, vpp, and power line frequency
- Measure rms current with user supplied external transformer and load resistor
- Each channel has separate inputs for monitoring current and voltage

Input Voltage Span

Programmable from 200 mV rms to 200 V rms

Input RMS Voltage or Current Inaccuracy
±3.0% maximum
Input Current Sense Range
0.5 to 5.0 A, through user specified and supplied transformer and termination resistor
Input Frequency Range
50 to 600 Hz
Input Frequency Inaccuracy
±0.05% maximum
Input Common Mode Voltage
±100V minimum, for specified common mode rejection ratio (CMRR)
Common Mode Rejection Ratio
82 dB minimum, with 50 ohm source
Differential Input Resistance
2 MΩ, ±1%, with power on or off
Common Mode Input
1 MΩ, ±1%, with power on or off
Maximum Safe Input Voltage
±250 volts, AC or DC, either input to ground
AC Coupling Cutoff Frequency
0.1 Hz maximum
Note: Specifications subject to change without notice.

770-050x Sixteen Channel EMF Multiplexed Signal Conditioner



The sixteen Channel EMF Multiplexed signal conditioner provides signal conditioning for electromotive force (EMF), piezoelectric, and other sensors with voltage outputs .The cards have single ended voltage inputs and are designed to interface with high impedance EMF voltage sources. The negative inputs of all conditioners are tied together on the card and brought out to a single common return pin or jumpered to system ground. These cards are available in a variety of voltage ranges and presample taker frequency ragnes.

EMF signal conditioners are available in two voltage ranges, with full scare input spans of 0.2, 2, 20 V or 2.5, 5, 10, 20 V. To accommodate unipolar and bipolar inputs, the offset voltage range is programmable over ±200% of span. Each channel is independently conditioned with 2nd order Butterworth, continuous time state variable, presampling filters defined at the –0.5 dB point. Each filter is programmable over an eight octave range with 4000 steps resolution. The cards have two analog to digital converters (ADCs), one for each group of eight channels.

HIGHLIGHTS

- Sixteen independently programmable signal conditioning channels
- Independently selectable input voltage ranges with programmable offset capability
- Cards have two 12-bit ADCs, one for each group of eight channels
- Butterworth, continuous time state variable, presampling filters defined at the –0.5 dB point
- Filters are programmable over an eight octave frequency range with resolution of 4000 steps

Card Configuration

16 independently signal conditioned channels for EMF, piezoelectric, and other sensors with voltage outputs. Cards have two multiplexed 12-bit ADCs.

Plug-In Cards

Part No.	Input Voltage Span	Presample Filter
770-0500	200 mV, 2 V, 20V	4 to 1024 Hz
770-0501	200 mV, 2 V, 20V	8 to 2048 Hz
770-0502	200 mV, 2 V, 20V	16 to 4096 Hz
770-0503	2.5 V, 5 V, 10 V, 20 V	4 to 1024 Hz
770-0504	2.5 V, 5 V, 10 V, 20 V	8 to 2048 Hz
770-0505	2.5 V, 5 V, 10 V, 20 V	16 to 4096 Hz

Input Voltage Resolution

3125 μV for input spans of 2.5 to 5 V
125 μV for input spans of 0.2 to 2 V
12.5 mV for input spans of 2 to 20 V

Input Voltage Inaccuracy

0.15% maximum of programmed value at 25°C

Input Voltage Temperaturd Coefficient

0.005% per°C maximum

Input Sampling Rate

40 kilosamples per second maximum per group of eight ports, based on minimum time interval between samples

Presample Filter Frequency

Programmable over a 256 to 1 frequency range with resolution of 4000 steps over the specified frequency range

Presample Filter Response

2nd order Butterworth, continuous time state variable, with cutoff frequency defined at the –0.5 dB point

Input Common Mode Voltage

±10 V maximum, for specified CMRR

Maximum Safe Input Voltage

±35 V AC or DC either input to ground

Common Mode Rejection

With EMF Inputs and 100 ohm Unbalance
76 dB minimum for input spans of 200 mV to 2 V
60 dB minimum for input spans of 2 to 20 V
86 dB minimum for input spans of 0.4 to 4 V

Differential Input Resistance

150 kΩ minimum

Common Mode Resistance

75 kΩ minimum resistance

Offset Range

Bipolar, ±100% of span referred to input

Offset Resolution

0.1% of span

Offset Inacceracy

0.1% of span maximum

External Balance

Each channel balances to midscale (0.0 volt)

Autobalance Range

Bipolar, ±200% of span referred to input

Autobalance Resolution

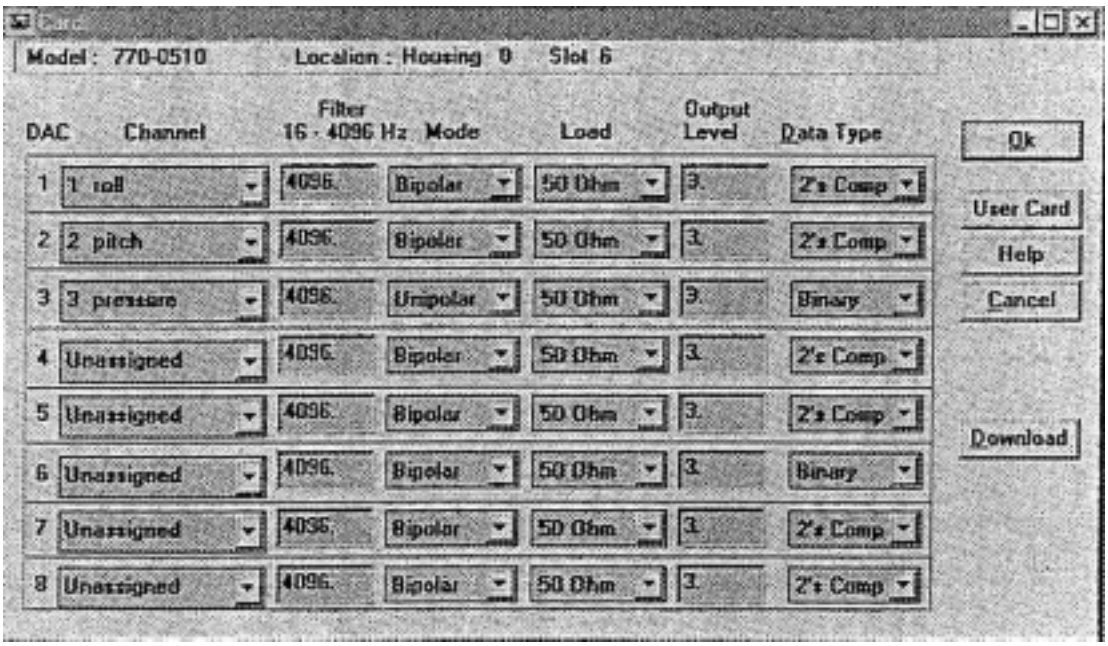
0.05% of span

Autobalance Inaccuracy

0.05% of span

Note: Specifications subject to change without notice.

770-0510 DAC Output Card



The DAC Output card provides the ability to monitor, in analog form, up to 8 data channels in the PCM system. Each analog output is a reconstructed digital to analog converter (DAC) output that is filtered through a continuous time reconstruction filter programmable over an eight octave frequency range with a programming resolution of 4000 steps. Analog outputs are designed to be monitored by equipment in both unipolar and bipolar modes.

HIGHLIGHTS

- Select any commutation type PCM channel for analog monitoring
- Eight independent DAC outputs
- Reconstruction performed at PCM data channel rates
- Programmable output offset and gain capability
- User programmable 2's complement or binary output
- Four pole programmable continuous time reconstruction filter

Card Configuration
: 8 independently programmable DACs with filtered analog outputs

Channel Selection
: Programmable selection of any channel in the 770 System's PCM frame

Data Resolution
: 12 bits

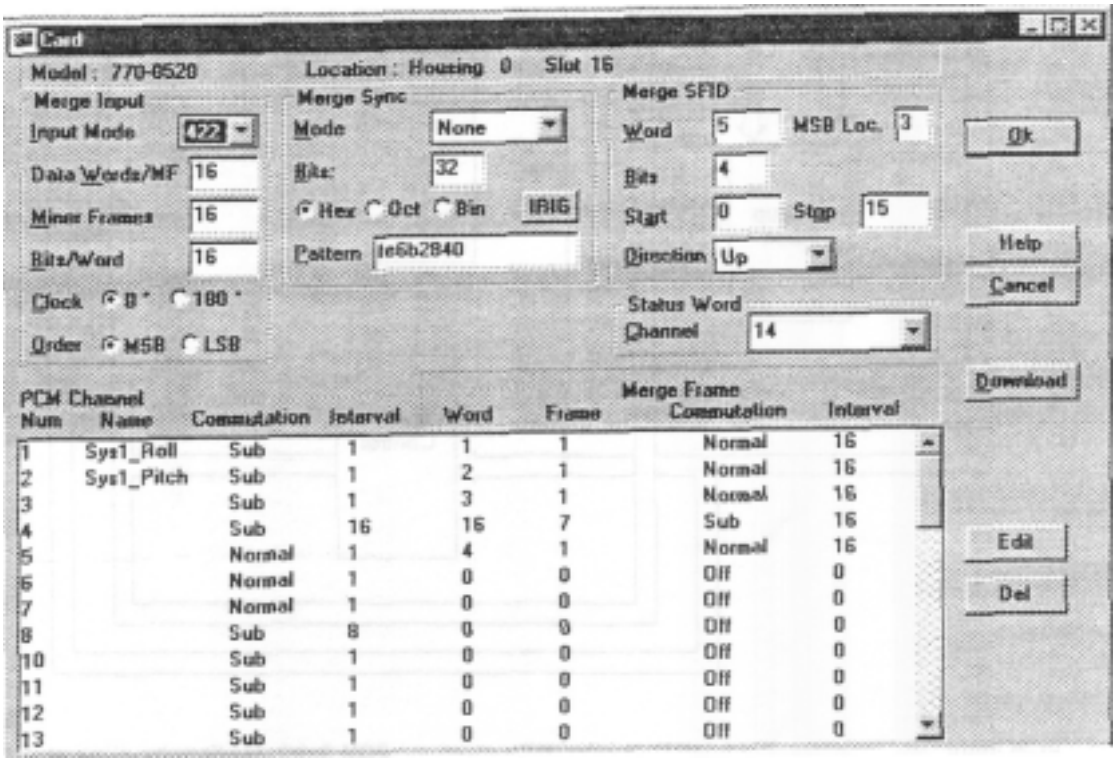
Output Level, Unipolar
: Programmable from 0.25 to 2.5 volts peak-to-peak (Vpp) into a 50 ohm load, or 0.5 to 5.0 Vpp into a load of 1000 ohms or more. Output source impedance is 50 ohms.

Output Level, Bipolar
: Programmable from 0.3 to 3.0 Vpp into a 50 ohm load, or 0.6 to 6.0 Vpp into a load of 1000 ohms or more. Output source impedance is 50 ohms.

Output Offset
: Selectable for unipolar or bipolar

Note: Specifications subject to change without notice.

770-0520 Asynchronous PCM Merge Card



The Asynchronous PCM Merge Card allows PCM outputs from other equipment to be merged into the 770 System's PCM output stream. The user programs the card with the synchronization pattern and frame format of the external PCM input. The card then extracts the desired words from the PCM stream and merges them into the 770 System's PCM output. Subframe synchronization is accepted using subframe ID (SFID) or frame code complement (FCC). The SFID is programmable for word location, start bit, and ID word length. Differential RS-422 receivers accept external PCM inputs from a Metraplex 760 PCM System or any other PCM encoder system.

HIGHLIGHTS

- Accepts NRLZ-L data and bit clock from any external PCM stream
- Programmable frame synchronization pattern permits detection of any external PCM input
- Programmable frame format accepts all commutation types and word lengths from 4 to 16 bits
- SFID is programmable for word location, start bit, and ID word length
- Decodes and stores PCM frames with up to 65,536 words
- Merges up to 1024 external channels into the 770 System's PCM frame
- Status bits can be included with each output word to indicate old data and missing data

PCM Input
NRZ-L data and bit clock
Input Impedance
4 kW, minimum
Input Positive Differential Threshold

+0.2 V

Input Negative Differential Threshold

-0.2 V

Maximum PCM Bit Rate

10.0 megabits per second

Maximum PCM Frame Size

65,536 words

PCM Format

User programmable

PCM Frame Synchronization

User programmable

PCM Subframe Synchronization

User programmable for SFID or FCC

PCM Word Length

4 to 16 bits, programmable by channel

Data Word Commutation

Normal commutation, subcommutation, supercommutation, and random commutation

Output PCM Word Selection

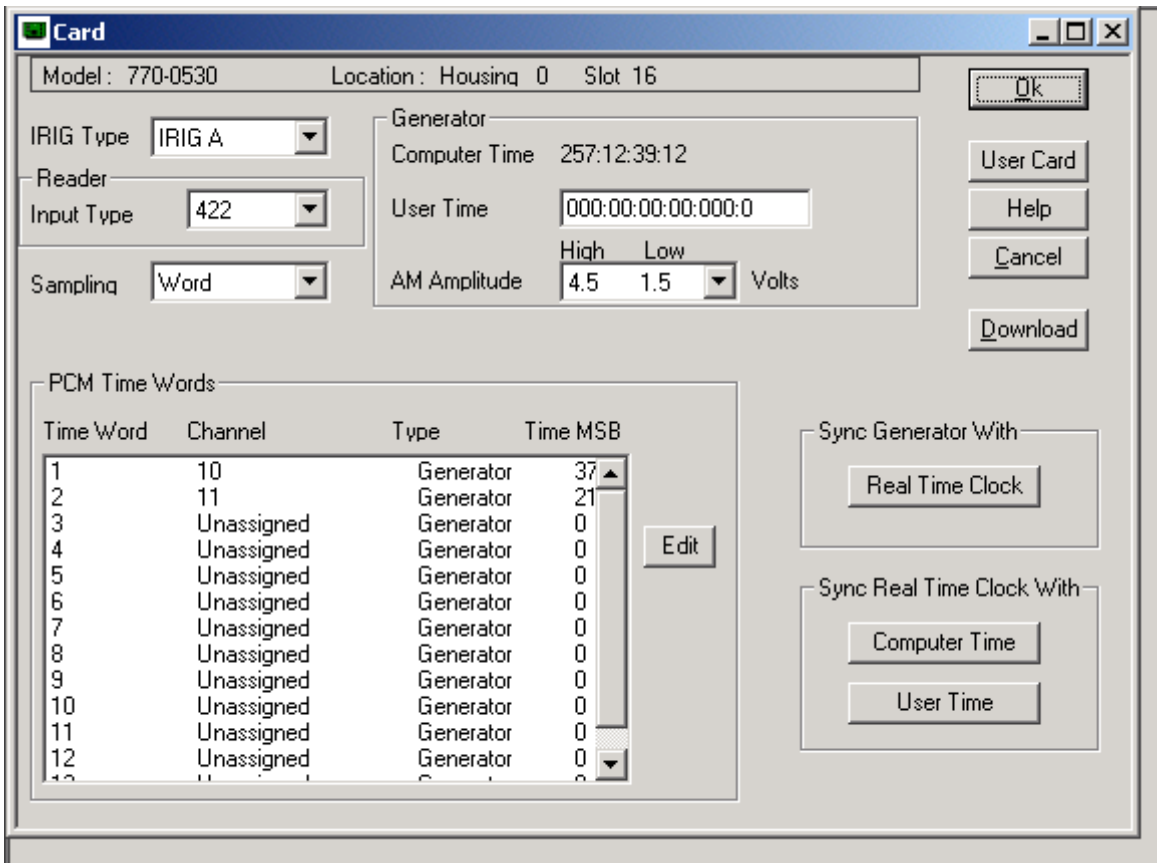
Programmable selection of up to 1024 channels for insertion into the 770 System's PCM frame

Status Bits

Stale and overflow status bits per IRIG 106-96 are provided to indicate old and missing data

Note: Specifications subject to change without notice.

770-0530 Time Code Generator/Reader Card



The Time Code Generator/Reader Card is a versatile device for generating, receiving, and outputting IRIG time code for insertion into the PCM stream, as well as for output to other equipment. The card is capable of generating or reading the IRIG A, B, or G time codes as specified in IRIG 200-89, IRIG Time Code Formats. As a time code reader, the card accepts either an amplitude modulated (AM) IRIG subcarrier or a serial IRIG bit stream with clock. As a time code generator, it can produce both AM IRIG subcarrier as well as serial IRIG data and clock with RS-422 drivers.

This card gives the user the flexibility of selecting and programming the format of the IRIG time code words to be divided into the PCM stream. In binary coded decimal (BCD) mode, the 9 BCD characters can be divided into 3 to 9 PCM words with 4 to 16 bits per word. In Binary mode, the 32-bit output can be divided into 2 to 8 PCM words with 4 to 16 bits per word.

HIGHLIGHTS

- Generates and reads IRIG A, B, or G serial time code or amplitude modulated subcarriers
- Outputs IRIG A, B, or G serial time code and amplitude modulated subcarriers
- Embeds IRIG time code into PCM stream in either BCD or Binary format

IRIG Codes Supported

IRIG A: 100 ms frame interval, 1 kHz bit rate

IRIG B: 1 second frame interval, 100 Hz bit rate
IRIG G: 10 ms frame interval, 10 kHz bit rate

AM Time Code Input

1 to 15 peak-to-peak voltage (Vpp) into 3.3 kW

Serial Time Code Input

Data and clock, with RS-422 or TTL levels

Embedded Time Code Mode

Binary coded decimal (BCD) or straight Binary

Embedded Time Code Format

Programmable selection of words and word size
BCD: 3 to 9 words with 4 to 16 bits per word
Binary: 2 to 8 words with 4 to 16 bits per word

Note: Specifications subject to change without notice.

Mini-Encoder

Specially designed for tight spaces and severe environments, Miniature Encoders are ideal for flight testing civilian and military aircraft, as well as mobile ground based data acquisition. The 770 PCM System housings are designed to provide maximum accuracy of test results. All housings are environmentally sealed with EMI/RFI shielding and gasketing. Microminiature D-type Metal (MDM) connectors provide hermetic seals and electromagnetic shields for signal wires and cables.
Mini-Encoders provide 3 or 4 card slots for signal conditioners and other special function cards. For maximum flexibility, a combination of Standard and Mini-Housings housings can be used in the same 770 PCM System.

HIGHLIGHTS

- Mini-Encoders are ideal for small stand-alone PCM system and for remote locations
- Metal shields inside the housing isolate card slots to minimize noise and crosstalk
- Environmentally sealed and shielded to meet MIL-STD-461C and MIL-STD-810E
- Signal Conditioner and other special function cards can be installed in any combination

System Configuration

Master System with up to 15 Slave Systems. Master Mini-Encoder provides 3 user configruable card slots that can be filled with an assortment of Signal Conditioner and other special function cards. Slave Mini-Housing provides 4 user configurable card slots. For maximum flexibility, Standard and Mini-Housings can be mixed in the same system.

Housing Options

770-0011 Miniature Master System with 3 user card slots and cover with recessed captive screws

770-0021 Miniature Slave System with 4 user card slots and cover with recessed captive screws

Master System Components

Master Systems include the following:

770-0031 Master Microprocessor for Mini-Housing

770-0061 PCM Output Card

770-0071 Interface Card for Master Mini-Housing

PCM Output Cable

Power Input Mating Connector with wires

RS-232 Computer Interface Cable

Slave System Components

Slave System include the following:

770-0031 Slave Microprocessor for Mini-Housing

770-0072 Interface Card for Slave Mini-Housing

Power Input Mating Connector with wires

Master-Slave Interface Cable

Master-Slave Interface Terminator

Miniature Power System

Provides power for up to four Mini-Housings. DC to DC converter power supply accepts input from 11 to 35 volts DC, without manual switching or adjustment. A typical system powering four Mini-Housings with full complement of cards draws about 4 A at 28 V DC

Note: Specifications subject to change without notice.

Standard Encoder

Modular configuration and programmable signal conditioning make the 770 PCM System ideal for airborne and mobile test applications. System housings are designed to provide maximum accuracy of test results in the most severe environments. All housings are environmentally sealed with EMI/RFI shielding and gasketing. Microminiature D-type Metal (MDM) connectors provide hermetic seals and electromagnetic shields for signal wires and cables.
Standard Encoders have an integral power supply and provide sixteen card slots for signal conditioners and other special function cards. For maximum flexibility, a combination of Standard and Mini-Housings can be used in the same 770 PCM System.

HIGHLIGHTS

- 16 card slots provide up to 256 signal conditioned channels per housing
- Metal shields inside the housing isolate card slots to minimize noise and crosstalk
- Environmentally sealed and shielded to meet MIL-STD-461C and MIL-STD-810E
- Signal Conditioners and other special function cards can be installed in any combination

System Configuration

Master System with up to 15 Slave Systems. Standard Encoder provides 16 user configurable card slots that can be filled with an assortment of Signal Conditioner and other special function cards. For maximum flexibility, Standard and Mini-Housings can be mixed in the same system.

Housing Options

770-0010 Master System with 16 user card slots and cover with recessed captive screws
770-0012 Master System with 16 user card solts and cover with 0.5-inch extended captive

thumb screws

770-0020 Slave System with 16 user card slots and cover with recessed captive screws

770-0022 Slave System with 16 user card slots and cover with 0.5-inch extended captive thumb screws

Master System Components

Master Systems include include the following:

770-0030 Master Microprocessor

770-0050 Power Converter

770-0060 PCM Output Card

770-0070 Interface Card

PCM Output Cable

Power Input Mating Connector with wires

RS-232 Computer Interface Cable

Slave System Components

Slave Systems include the following:

770-0040 Slave Microprocessor

770-0050 Power Converter

770-0062 Slave Output Terminator Card

770-0070 Interface Card

Power Input Mating Connector with wires

Master-Slave Interface Cable

Master-Slave Interface Terminator

Power Requirements

DC to DC converter power supply accepts input from 11 to 35 volts DC, without manual switching or adjustment. A typical Standard housing with full complement of cards draws about 4 A at 28 V DC

Note: Specifications subject to change without notice.