

**GRUMMAN AIRCRAFT ENGINEERING CORPORATION
BETHPAGE, L. I., NEW YORK**

SECTION VII

Telemetry

Sig. Ref.	Figure	
G1	28	Downlink Start
G2	28	Downlink Stop
G3	28	Bit Sync. Pulse
G4	29	Serial Digital Data
G5	30	1024 KPPS Sync. Signal

Signals G1 - G3

Pulse Characteristics (See Appendix A for pulse Terminology)

Amplitude: 4.5 ± 1 volts
 Width: 4 ± 1 microseconds
 Droop (max): not applicable
 Backswing (max): 0 volts
 Rise time (max): 0.3 microseconds
 Repetition Rate: 50 pps for signals G1 & G2
 2KPPS* for signals G3

- Noise limits:
1. During the "ON" condition, the signal plus noise shall remain within the envelope defined by the parameters specified above.
 2. During the "OFF" condition, the noise shall remain within the envelope defined by the upper limit of +0.4V, and lower-limit of -4.0V measured with respect to the amplitude reference level.

Signal levels specified above are measured at source (PCMETE) with 200 ohm resistive load. Source and load impedances are measured between "HI" & "LO" with "LO" as reference. Signals are defined and/or measured with respect to "LO" as reference.

For digital read-out timing see page 70.

*A burst of pulses 50 times per second. Each burst contains 40 pulses occurring at a rate of 51.2 KPPS. (See figure 27)

Signal G4

Pulse Characteristics (See Appendix A for pulse terminology)

Amplitude: 7 ± 2 volts
 Width: ** 4 ± 1.25 microseconds
 Droop (max): 20%
 Backswing (max): 6 volts
 Rise time (max): 0.2 microseconds
 Repetition rate: ** as commanded by BIT Sync. and data.

**See Figure 27.

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Signal G4 (Continued)

- Noise Limits:
1. During the "ON" condition, the signal plus noise shall remain within the envelope defined by the parameters specified above.
 2. During the "OFF" condition, the noise shall remain within the envelope defined by the upper limit of +0.4V, and lower limit of -4.0V measured with respect to the amplitude reference level.

Signal levels specified above are measured at LGC with 500 ohm resistive load. These signals are defined and/or measured with respect to low as reference.

Source and load impedance are measured between "HI" & "LO" with "LO" as reference.

For timing see Figure 27 (Page 70).

Signal G5

Pulse Characteristics (See Appendix A for pulse terminology)

- Amplitude: 7 ± 3 volts *
- Width: 0.5 ± 0.25 microseconds
- Drop (max): not applicable
- Backswing (max): not applicable
- Rise time (max): 0.2 microseconds
- Repetition rate: 1024 KPPS
- Frequency stability: ± 2 parts per million

- Noise limits:
1. During the "ON" condition, the signal plus noise shall remain within the envelope defined by the parameters specified above.
 2. During the "OFF" condition, the noise shall remain within the envelope defined by the upper limit of +0.4V, and lower limit of -4.0V measured with respect to the amplitude reference level.

Signal levels specified above are measured at LGC with 120 ohm resistive load. This signal is defined and/or measured with respect to Low as reference.

Source and load impedances are measured between "HI" and "LO" with "LO" as reference.

*The amplitude of the Sync. signal may decrease to 3.5V for 150 microseconds when the LGC is switched from Standby to Operate. This can cause a loss of PCM telemetry for up to one second.

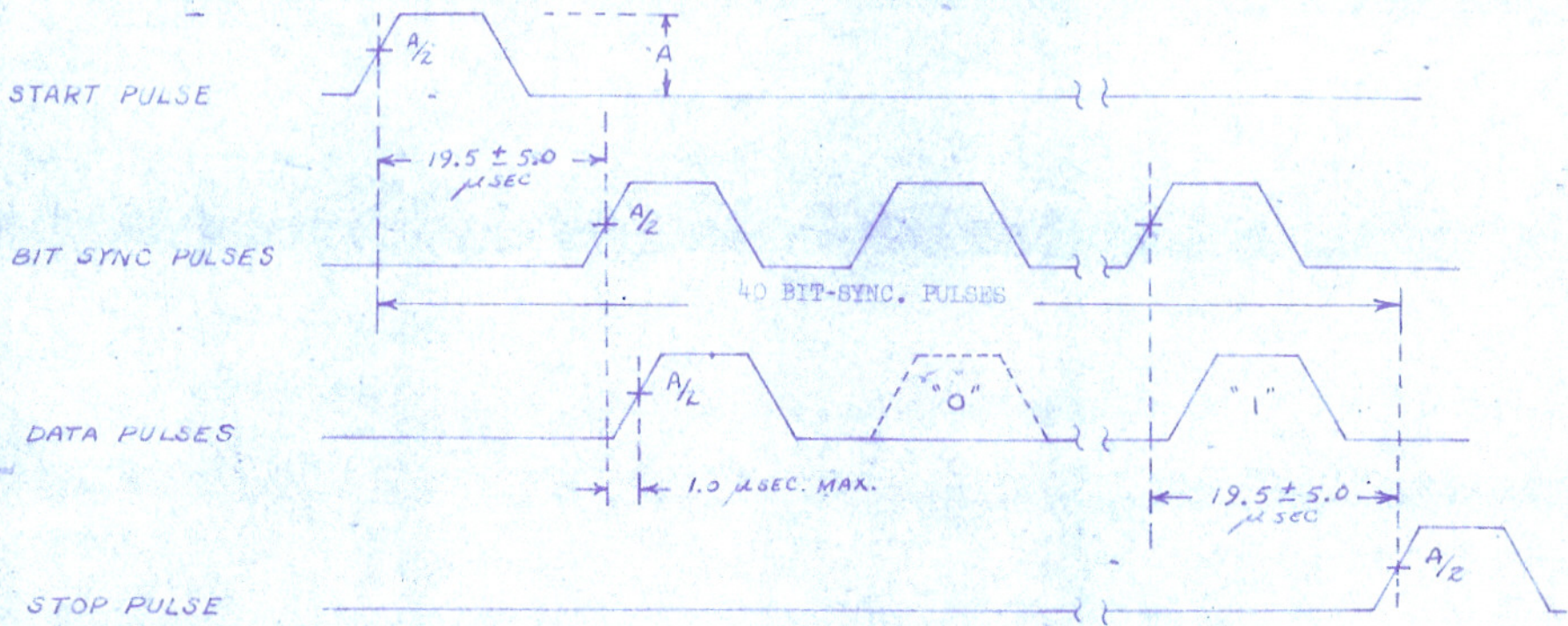
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REV D



DATA PULSE FREQUENCY AND WIDTH ARE DEPENDENT ON BIT SYNC. PULSE FREQUENCY AND WIDTH.

FIG. 27

DOWNLINK TIMING

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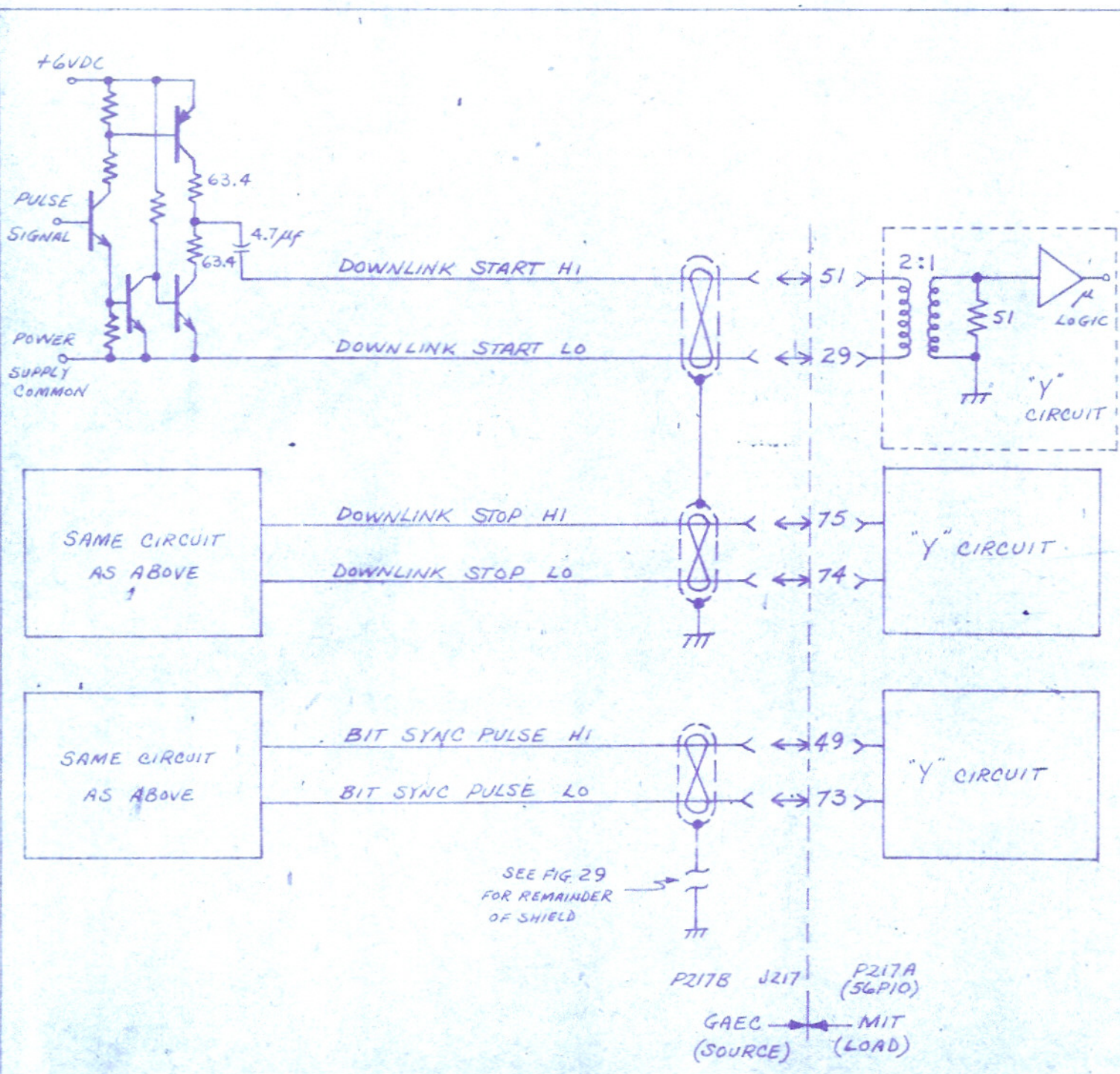


Fig. 28

DOWNLINK TIMING PULSES

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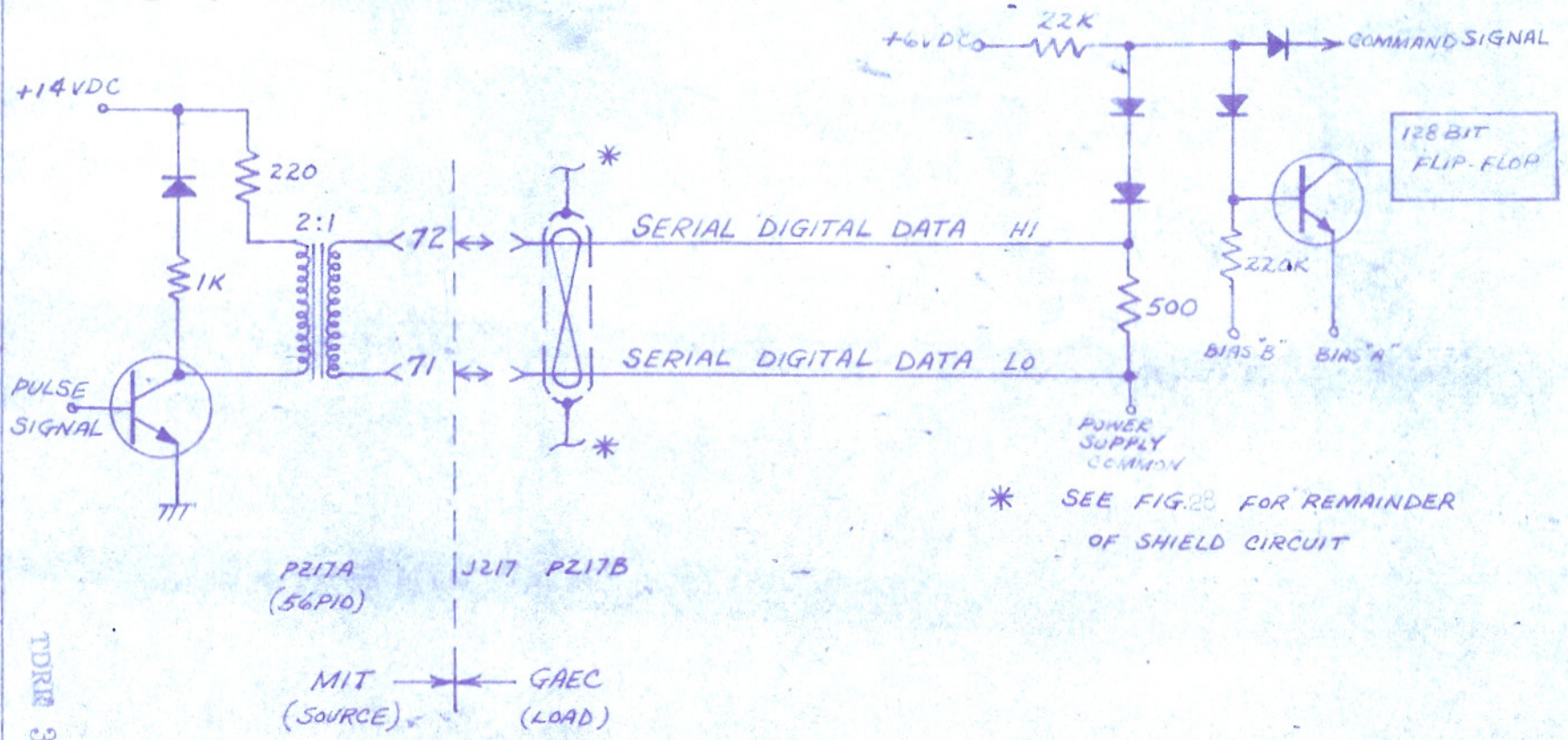
REV D

ID	SIGNAL	Z SOURCE OHMS ±10%		Z LOAD OHMS ±10%		FUNCTIONAL DESCRIPTION	
		LOGIC	"1"	"0"	"1"		"0"
G1	Downlink Start		100	100	200	< 20 <(20nh)	Positive pulse from PCM notifying LGC to prepare for shiftout of LGC 40 bit word to PCM.
G2	Downlink Stop		100	100	200	< 20 <(20nh)	Positive pulse from PCM notifying LGC that PCM receipt of data word from LGC is terminated.
G3	Bit Sync. Pulse		100	100	200	< 20 <(20nh)	Burst of 40 positive pulses from PCM to strobe out LGC 40 Bit serial data word.

values in parenthesis indicate inductance of transformer winding "seen" at interface.

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* SEE FIG. 28 FOR REMAINDER OF SHIELD CIRCUIT

Fig. 29
 DOWNLINK

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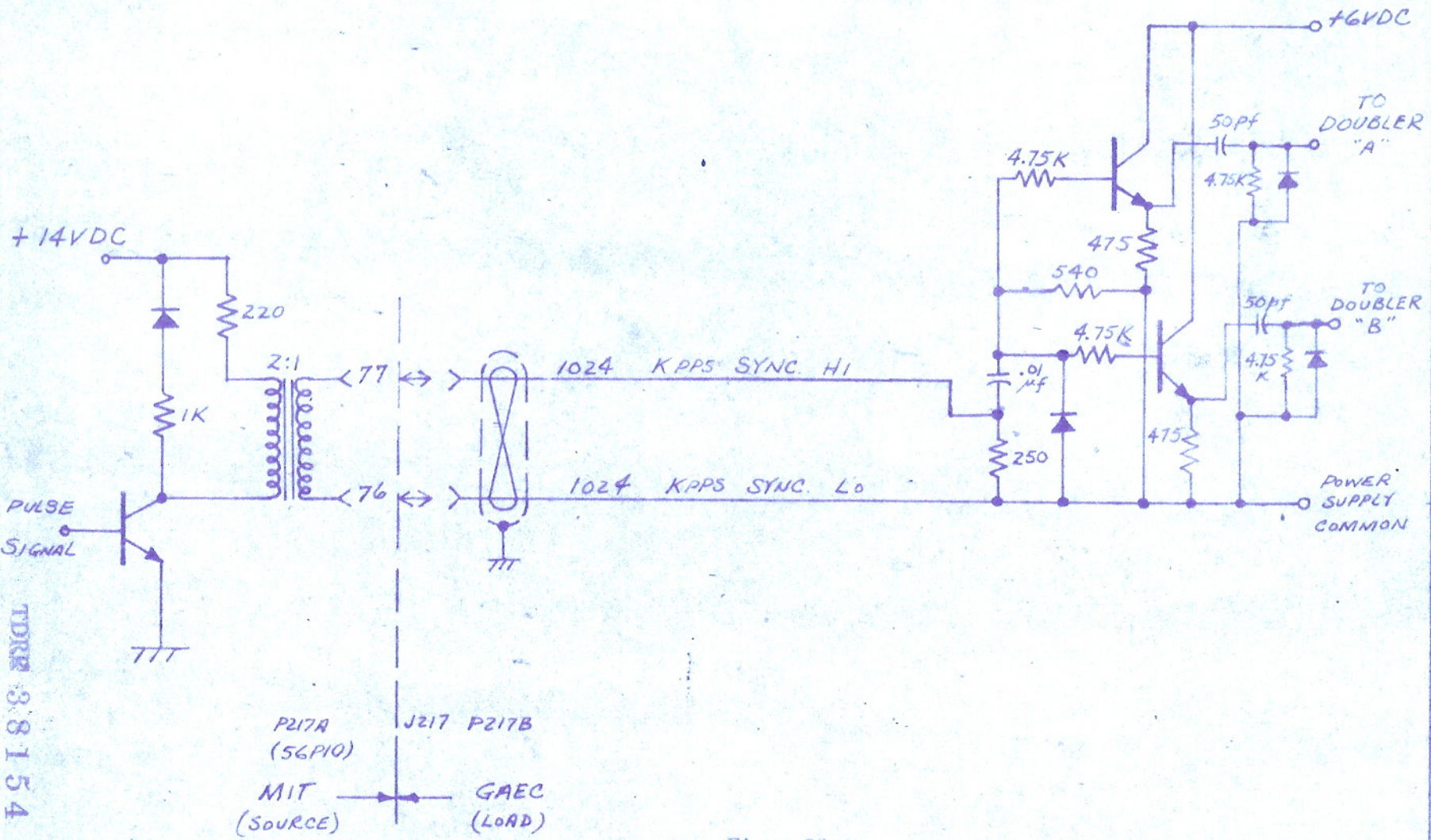


Fig. 30
 MASTER CLOCK

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ID	SIGNAL	Z SOURCE OHMS $\pm 10\%$		Z LOAD OHMS $\pm 10\%$		FUNCTIONAL DESCRIPTION	
		LOGIC	"1"	"0"	"1"		"0"
04	Serial Digital Data		< 100	< 10 <(10mh)	500	500	40 bit words, 50 times per second from LGC to PCM after LGC receives a Downlink Start pulse and Bit Sync. Pulses from PCM. A data "1" is the presence of a positive pulse "coincident" with a Bit Sync. Pulse. A data "0" is the absence of a pulse coincident with a Bit Sync. Pulse. Data will be all "1"s when LGC is in standby mode.
05	1024 KPPS Sync. Signal		< 100	< 10 <(10mh)	120 \pm 25%	120 \pm 25%	1024 KPPS positive pulses from LGC to synchronize PCWTEA with LGC.

values in parenthesis indicate inductance of transformer winding "seen" at interface.

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REV

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